

**THE RAILWAY GAZETTE**  
A Journal of Management, Engineering and Operation  
INCORPORATING  
**Railway Engineer • TRANSPORT • The Railway News**  
**The Railway Times • Herapaths Railway Journal • RAILWAY RECORD.**  
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**INDEX**

An index to the seventy-fifth volume of THE RAILWAY GAZETTE covering the issues from July 4 to December 26, 1941, has been prepared, and is now available free of charge on application to the Publisher

**GOODS FOR EXPORT**

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export

**DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS**

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 of 1940, and No. 359 of 1941

**ANSWERS TO ENQUIRIES**

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

**TO CALLERS AND TELEPHONERS**

Until further notice our office hours are:

Mondays to Fridays 9.30 a.m. till 3.45 p.m.

The office is closed on Saturdays

**Railway Commission at Work**

NO time has been lost by the Railway Companies' Association Commission on Post-War Planning & Reconstruction in commencing its task. The announcement that the Commission had been appointed by the railway companies was made on January 7, and the inaugural meeting was held at Euston Station on January 15. At page 136 we reproduce an illustration showing Sir Ronald Matthews, Chairman of the Railway Companies' Association, and the members of the commission at their first session. We dealt at some length with the wide scope of the investigation which faces the commission in our issue last week, when we also pointed to the fact that the commission was composed of essentially practical railway men. The speed with which that body has commenced to tackle the multifarious problems involved in the successful prosecution of its task is typical of the personal energy of its individual members, and is a hopeful augury for the ultimate success of its labours. There has been widespread approbation of the action of the railway companies in establishing the commission, and from the comments which have appeared in varying sections of the press it is evident that although the magnitude of the task facing the commission is fully appreciated, it is realised that far better results are likely to be achieved by a body born within the industry than from one superimposed upon it from without. There can be no hope of an early report by the commission, for obviously the scope of the field to be covered by its labours precludes such a possibility. Furthermore, it is realised that the findings of the commission must, in large part, be conditioned by knowledge of the state of the railways, other forms of transport, the general industry and commerce of the country, and national plans for the peace which exist at the end of the war. A great deal of the successful preparation for that period will depend upon the co-operation which the commission is able to obtain from Government Departments, local authorities, and so forth, and it is to be hoped that every assistance will be afforded the commission.

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**Dublin Transport in 1941**

During the year 1941 the Dublin United Transport Company carried a heavily-increased passenger traffic as a result of the severe restrictions on the supply of petrol to private motorists. The increase in the monthly total of passengers ranged between 1,000,000 and 3,000,000. At the same time, the difficulty increased in obtaining the large supply of fuel oil required for the operation of the company's buses. In March of last year the fuel situation made a slight curtailment of services necessary. Some routes were withdrawn, another was shortened, and services on other routes were reduced. Some months later a serious reduction in the company's quota of fuel made more extensive curtailment essential. All services from the city ceased at 11 p.m. Sunday morning services were reduced, and two further services were withdrawn. In November the company introduced minimum fares at peak hours on a number of long-distance routes, to prevent long-distance travellers being crowded off by persons making short trips. At the instigation of the company, the Department of Industry & Commerce in Eire inaugurated conferences with representatives of employers and workers to secure a staggering of the demands on passenger transport at peak hours. In Dublin, as elsewhere, it has not so far proved possible to solve entirely the difficulties of rush-hour traffic concentration.

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**Canadian National Railways and the War**

In few countries has the increase in traffic handled as a direct result of the war been so marked as in Canada, where demands upon railway transportation in this war period have already exceeded those of the last by 60 per cent. In the case of the Canadian National Railways, the volume of traffic moved since the outbreak of hostilities has risen by 95 per cent., and it is obvious that so rapid an increase could have been dealt with only by most careful planning so as to make the best possible use of the rolling stock, other equip-

ment, and general facilities available. Considerable quantities of new rolling stock have had to be purchased and a wide expansion of facilities in certain directions has been essential. Despite the rapidly rising cost of materials and wages, it now seems certain—though final figures are not yet available—that the year 1941 will show a surplus after meeting all expenses and charges. Working receipts are expected to total \$303,000,000 and net revenue after meeting all expenses including depreciation should amount to \$66,000,000, the highest in the history of the system; taxes and fixed charges, including interest, will be some \$62,000,000. "It is an ill-wind" that makes possible even a small surplus after so many years' deficits.

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### Overseas Railway Traffics

Among British-owned railways in Argentina the best traffic return for the 27th and 28th weeks of the financial year is that of the Buenos Ayres Great Southern, with an increase of 982,000 pesos. Next comes the Central Argentine with an advance of 400,750 pesos. Five companies together show an increase of 1,573,950 pesos for the two weeks, but against this must be set the fall of 182,000 pesos recorded by the Buenos Ayres & Pacific. In Central Uruguay traffics for the 28 weeks of the financial year there was a rise of £61,186. The San Paulo (Brazilian) Railway traffics for the complete year 1941 amounted to £1,923,141, an increase of £11,033 in sterling, with an advance of 7,884 contos in currency. As already recorded the Canadian Pacific increase in 1941 was £10,096,200.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific* ...	28th	1,450	-134	36,953	+3,517
Buenos Ayres Great Southern* ...	28th	2,716	+427	63,305	+8,018
Buenos Ayres Western* ...	28th	780	+6	23,063	+3,891
Central Argentine* ...	28th	1,695	+218	49,086	+9,927
Canadian Pacific ...	1st	753,200	+125,200	—	—
Bombay, Baroda & Central India ...	39th	369,750	+36,300	8,119,875	+679,725

\* Traffic returns in thousands of pesos

The aggregate return of the Bombay, Baroda & Central India covers the period which ended on December 31, 1941. On January 1, 1942, the working of the line was taken over by the Government of India.

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### Road Transport in Venezuela

Considerable sums of money have been spent by the Venezuelan Government in recent years for the improvement of the national roads, in order to fit them for fast motor traffic. Extensions have also been built. There are now 5,667 miles of road, of which some 2,000 miles are surfaced highway. The principal road is the National Highway from Caracas 800 miles to the Colombian frontier, whence it is continued as far as Cucutá in Colombia; a branch road runs off from Valencia to the coast at Puerto Cabello. Another great highway connects Caracas with Ciudad Bolívar, 600 miles. A third runs from Coro, in the north, to San Cristóbal in the south, passing through Trujillo and Merida, with a branch westward from Carora through Barquisimeto to Acarigua, where it joins the National Highway. At present work is being concentrated on improvements, particularly on surfacing and flood protection, but an ambitious plan of extensions is in contemplation, as vast tracts of country in the interior are still served only by cart tracks, and even these are impassable at certain seasons. According to a recent return, Venezuela now has 17,635 registered motorcars, 13,847 lorries, and 1,542 buses, a total of 33,024 motor vehicles.

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### Water Supply Maintenance by Welding

The economy achieved by the use of welding in the maintenance of railway water supplies was emphasised in a report presented at the recent annual meeting of the American Railway Bridge Association in Chicago. It was mentioned that the water service department on one railway has

equipped its system gang and 11 division gangs with oxy-acetylene welding outfits, while one of the division gangs has also an electric welder for shopwork, welding iron castings, and thawing frozen service pipes. Welding is used almost exclusively on this railway in repairing pipe lines for air, steam, and water distribution in the yards, and for the various pipe lines in shops, engine sheds, and power houses. For new work, bevel-end pipes and fittings are provided ready for welding. This obviates many unions which are often a source of trouble. Reductions, bends, tees, elbows, and branch connections can be welded in place more satisfactorily and in about half the time required for screw connections. In repairing a leaky joint, a short piece of pipe can be spliced in, making a secure and rigid job. Welding has reduced the number of fittings required by 66 per cent., and is used for all kinds of repair work in iron, aluminium, brass, and copper. The greatest use of welding in water service work is reported to be in welding and cutting pipe, melting joints in cast-iron pipe, and in improvising connections.

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### S.R. Electric Locomotives to Aid War Effort

The problem of designing an electric locomotive that would continue exerting a drawbar pull when passing over the unavoidable "gaps" in the conductor rail which occur at junctions and crossings, has been engaging the thought of Mr. A. Raworth the Southern Railway's Chief Electrical Engineer for some years past. A design that overcame the difficulty was evolved some time before the outbreak of war and two experimental electric locomotives were already under construction in September, 1939. As opportunity offered, without interfering with more urgent war work, one of these engines has now been completed and the second one will shortly be ready. As they can work continuously for long periods without going to shed, these two electric locomotives will be most useful in freight traffic working and enable more steam locomotives to be released for war traffic elsewhere. With a 1,000 ton freight train the engines have an acceleration of 24 m.p.h. in 100 seconds, and can also haul the heaviest Southern passenger trains at speeds up to 75 m.p.h. A brief account of the first of these electric locomotives appears elsewhere in this issue, and we hope to publish a more detailed account in a future issue.

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### Wartime American Freight Wagons

At page 91 of our issue last week we recorded that as a war measure the Association of American Railroads has decided to limit orders for freight wagons to 13 designs, of which we gave some details. Four types of box wagons are based on A.A.R. standard designs; so also are the two types of hopper cars which are of 50-ton and 70-ton capacity respectively. There is no A.A.R. standard gondola, but the new wagons are of a type that has already been built. Two of the flat wagons are of the usual riveted steel type, one of 50-ton and the other 70-ton nominal capacity, but the third type has a solid cast-steel underframe and a capacity of 70-tons. For the non-standard types the makers have willingly exchanged the designs to aid the common defence cause. All the new wagons are of such dimensions as to permit of free interchange over all main lines. Any additional wagons of special types to carry particular traffics peculiar to individual railways must be ordered only in just such numbers as are essential to handle that special traffic. The wagon-builders report that the new designs present no difficulties in the matter of dies that may have to be made.

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### A Unique Coach Conversion

It must be a rare event for the same coaching stock to be used first in the composition of steam-hauled trains, then to be converted into multiple-unit sets for electric working, and finally to be reconverted for use in steam-propelled push-and-pull trains. These successive transformations have happened, however, to the ex-Metropolitan coaches now used in shuttle working as push-and-pull trains over the Chalfont



and Chesham branch of the L.N.E.R. and L.P.T.B. joint companies. The coaches were first built in 1898 for service over the Metropolitan Extension line between Baker Street, Aylesbury, and Verney Junction, replacing the 8-wheel radial stock then in use. Then came the extensive Metropolitan electrification, and in order to make the stock available for electric working, it was assembled into six-coach multiple units, the end coaches of each set being fitted at Neasden works with four British Westinghouse 150 h.p. motors. One of these motor-coaches figured among the exhibits at the British Empire Exhibition of 1908. Despite 43 years of continuous service, the steel underframes and teak bodies of these coaches are still in such good condition as to warrant yet another conversion, and this has recently taken place. They have been made up into three-coach sets, with a steam tank engine of the L.N.E.R. at one end, and a driver's compartment in the coach at the other end. From the latter the engine regulator is controlled by a vacuum-operated intermediate regulator valve with three positions—"quick start," "open," and "shut"—indicated to the driver by a vacuum gauge. The brake equipment supplies the necessary vacuum, and the Vickers electric carriage-lighting sets furnish current for the electric horns and bell signalling equipment.

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### American Receivers and Trustees

Despite creditable operating ratios, a large number of American railroads are for one reason or another in the hands of receivers or trustees, but there is a distinct difference between the two. Receivership is instituted by creditors to realise from the assets of the railroad a sum sufficient to pay their claims in full or in part. This is done through court action, and usually involves a sale of the railroad properties, and may also involve a scheme of reorganisation sponsored by creditors. Both the sale and reorganisation are developed without the supervision of the courts or of the Interstate Commerce Commission. A trusteeship generally is initiated by the railroad itself with the purpose of promoting schemes of operation in which the stockholders and creditors can work in co-operation. The proposals are brought before the I.C.C. and after examination and any comments are passed to the courts for approval or rejection. A two-thirds majority vote of the stockholders and creditors is required after court approval before the trusteeship can become effective. At the conclusion of a trusteeship the railroad property may not be sold publicly, and any disposal must be to the benefit of the railroad.

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### Heat Treated Tyres

One of the subjects discussed at the recent annual meeting of the Mechanical Division of the Association of American Railroads was the failure of tyres on the driving and trailing wheels of locomotives. This had been particularly troublesome on six large systems in that country, with locomotives engaged in fast and heavy service. Four years of research have been devoted to this problem, and the outcome is a strong recommendation of the quenching and tempering of tyres. Not only has suitable heat-treatment overcome the tendency of tyres to shell, and thus to develop the incipient flaws that result in ultimate failure, but the treatment has considerably reduced wear, an average of 22,000 miles per  $\frac{1}{8}$ -in. of wear having been obtained with the quenched and tempered tyres as compared with 6,800 miles in the case of tyres which have not been so treated. Of the former 997 have been under test, and of the latter 3,972, so that a very thorough investigation of the problem has taken place. A test was also made of normalised tyres, but this produced some poor results; the reason is not given, but it is probably that while the shelling may have been cured the rate of wear was accelerated. In this country the Sandberg sorbitoric process has had a limited vogue for the treatment of tyres, and these American findings may well prompt a further investigation of the subject, with the proviso, however, that the aim of all tests should be to equalise wear as between tyres and rails.

## Government Control of Railways

IN THE RAILWAY GAZETTE of October 3 we published the White Paper outlining the revised financial arrangements under the Railway Control Order, 1939, which provided that the financial agreement of February, 1940, should be amended largely by the substitution of a fixed annual rental payment to the railways for the guaranteed minimum net revenue and varying profit arrangements of the original agreement. There has now been published by the Stationery Office the Railways Agreement (Powers) Order, 1941, dated December 19, 1941, and made by the Minister of War Transport. This Order is to empower the controlled railway undertakings to enter into, and carry out, the revised agreement, and in large part it repeats the provisions of the White Paper published in October. The Railway Control Agreement has not yet been executed, but the details given with the new Order supplement, in many important respects, the bare outline given in the White Paper, and include matters made public for the first time. The agreement deals at some length with the proceeding which is to be adopted as to maintenance charges, which, as was already known, include renewals, and are standardised on the basis of an average prewar charge adjusted for variation in assets in service and in price levels. It is made clear that the sum to be charged for maintenance is to be in relation to items set out by a committee which is to contain one representative nominated by the Ministry and five by the Railway Clearing House, and which will make rules to be followed for various purposes. These items are to consist of the aggregate amounts charged in ascertaining the net revenue for the base period, with any variation required in the base period to correspond with any change which has taken place in the assets, and an addition or deduction to represent the change in the real value of the base period charge due to rises or falls in the hourly rates of wages and price levels. If the charge allowed on that basis is greater than the net amount actually expended, the difference in any subsequent accounting period is to be brought up to date by an addition or deduction, and if the net amount is greater than the charge the excess will not be included in the net revenue accounts. Provision is to be made for carrying this into effect, and in particular for securing that the items of maintenance shall, as far as possible, include all sums charged in respect of maintenance of the assets of the controlled undertakings which are subject to maintenance, and that the addition or deduction to be made is calculated by reference to the difference between the aggregate expended and whatever the corresponding figure would have been if that expenditure had been calculated at base prices. No other charge is to be allowed except so far as the Minister may agree to its inclusion in respect of abnormal wear and tear. Where the amount of maintenance charges allowed is less than actual expenditure a sum not exceeding the difference will be included in the net revenue accounts in respect of any abnormal wear and tear that may be agreed between the parties or determined by arbitration.

In dealing with the ascertainment and disposal of net revenue the agreement provides that nothing is to be included in respect of ownership of, or interest in, a number of undertakings which are set out in detail for the first time, and which are as follow :—

The railway companies' interest in road transport undertakings authorised by Section 11 of the Road Transport Acts, 1928, of the amalgamated railway companies except (a) the interest of the London Midland & Scottish and the London & North Eastern Railway Companies in the Sheffield "C" omnibus services and (b) the interest of the London & North Eastern Railway Company in the Gainsborough Omnibus Service.

The railway companies' interest in air transport undertakings authorised by Section 8 of the Air Transport Acts, 1929, of the amalgamated railway companies.

The Northern Counties Railway (Ireland)—owned by the London Midland & Scottish Railway Company.

The London Midland & Scottish Railway Company's financial interests in the following Irish Undertakings :—

The County Donegal Railways Joint Committee.

The Dundalk, Newry & Greenore Railway Company.

The Great Northern Railway Company (Ireland).

The Great Southern Railways Company.

The amalgamated railway companies' interest in the following undertakings :—

David MacBrayne Limited.

MacBraynes Trust Limited.

Wilson's & N.E.R. Shipping Co. Ltd.

Humber Graving Dock & Engineering Co. Ltd.

Penarth Pontoon, Slipway & Ship Repairing Co. Ltd.

Sheffield & South Yorkshire Navigation Company.

The agreement also deals at some length with the investment, through a trust fund, of the difference which may arise

if the actual expenditure on maintenance is less than the standard, and these funds, with the accrued interest, will meet the cost of any arrears of maintenance overtaken during the period of control. In explaining the terms of the original agreement for the guaranteeing of a minimum net revenue and the division of sums in excess of that amount until the standard revenues of the undertakings are met, the agreement gives the following table of the standard revenues which were to rank for the purpose of the arrangement:—

STANDARD REVENUES FOR THE PURPOSES OF THE AGREEMENT

Name of controlled undertaking	Amount
	£
1. Southern Railway Company ... ..	7,095,870 (a)
2. Great Western Railway Company ... ..	8,466,560 (a)
3. London Midland & Scottish Railway Company ... ..	20,579,930 (a)
4. London & North Eastern Railway Company ... ..	15,216,735 (a)
5. London Passenger Transport Board ... ..	5,493,881 (b)
6. East Kent Light Railway Company ... ..	4,732 (c)
7. King's Lynn Docks & Railway Company ... ..	7,666 (c)
8. Mersey Railway Company ... ..	145,422 (c)
9. Shropshire Railways Company ... ..	1,172 (c)

(a) The standard revenue and allowances ascertained from time to time in accordance with the provisions of the Railways Act, 1921, and the principles laid down by the Railway Rates Tribunal and set out in its Judgment of July 18, 1939.

(b) A net revenue representing interest in full on London Transport prior charge stocks and 5½ per cent. on London Transport "C" Stock.

(c) The minimum amount of the company increased proportionately to the difference between the minimum amounts and the standard revenues of the first five controlled undertakings.

As to the distribution of the net revenue from the pool of receipts and expenditure, a table is given (reproduced at page 138) which shows the names of the controlled undertakings in full detail (column 1), the amounts guaranteed under the original agreement and the base period adopted for arriving at this average minimum (column 2), and the annual sums which are to be paid under the revised agreement (column 3). The original arrangements made for dealing with air raid precautionary measures on the main-line railways and the railways of the London Passenger Transport Board are modified and this matter is dealt with at page 138. The agreement states that payments by Government Departments to the controlled undertakings in respect of services rendered (including conveyance of traffic) or in respect of the exclusive use by departments of property will be in accordance with Treasury instructions issued from time to time, or in instances in which those instructions are not applicable, in accordance with the provisions of the Compensation (Defence) Act, 1939. A circular letter, dated June 1, 1940, from the Treasury to Government Departments outlines the basis of the charges to be made and also the procedure to be followed in the event of additional railway facilities being required which involve works.

### Continuous Welded Rail

IT was in 1933 that the first section of continuous welded rail in long lengths was laid on the Delaware & Hudson Railroad; a further section was laid in 1934. These original installations were described in THE RAILWAY GAZETTE of February 15, 1935. Since that date more than 40 lengths have been put down on twelve different railways in the U.S.A. Realising the important influence which the successful outcome of these experiments might have upon track maintenance problems, we have endeavoured to keep our readers up to date by publishing from time to time further information on this subject, the last appearing on March 3, 1939. We now summarise at page 120 the results of seven years' experience as reported by the Chief Engineer of the Delaware & Hudson Railroad, Mr. P. O. Ferris, who succeeded the late Mr. H. S. Clarke, the pioneer of this form of track. It is encouraging to learn that of nearly 11,000 welded joints there have been only 29 failures of which 25 were thermit welds and four flash-butt welds; what is more important is that the causes of these failures have been ascertained and apparently eliminated.

Regarding the economic aspect of these experiments, Mr. Ferris has supplied the comparative maintenance cost in man-hours per track mile of normal jointed track and continuous welded track respectively. These records at present extend over comparatively short periods of two and three

years and therefore are not conclusive, but the results to date seem to show that by using long welded rails the upkeep costs of the track itself are substantially reduced, quite apart from savings on rolling stock maintenance and reduced motive power; in short the indications are that the use of continuous rails may before long become common practice in the U.S.A. So far as British railways are concerned, the use of very long rails has not yet been adopted except on the L.P.T.B. tube lines, where temperature changes are slight and stresses in the rail due to such variations are therefore small.

It is reasonable to assume that the post-war era will find the railways in this country having to face a still more insistent demand for higher speeds and greater comfort coupled with lower maintenance costs—ideals hitherto difficult to reconcile. As it seems probable that the use of these long rails can do much to solve this problem, it appears opportune to summarise the progress so far made in America. Experience shows that the risk of failure of modern welds is negligible, that these long rails can be handled and installed without much difficulty, and there does not appear to have been any track distortion arising from excessive compressive stresses in the rails during hot weather. Records so far available point to a substantial reduction in the work of track maintenance. As we see it the chief material difference between conditions in this country and the U.S.A. is in respect of the type of rail used, and the question arises as to whether the compressive stresses in the comparatively narrow British bull-head rail can be kept sufficiently low in very hot weather to prevent local distortion taking place. It is not entirely a question of adequate ballast since there is always a possibility of distortion occurring if the track is jacked up for fettling purposes while the temperature is high. But if this is the only serious cause for misgiving it is surely worth considering after the war, whether the advantages and economies which may accrue by the virtual elimination of rail joints would not justify the use of flat-bottom rails, at least for plain line track, even if it were considered desirable to retain the bull-head type for point and crossing work. The addition to the present number of standard parts and fittings would be quite small.

### The Railways of Eire in 1941

FOR the 52nd week of 1941 the Great Southern Railways Company (Eire) reports passenger receipts of £38,742 (against £34,999), and goods receipts of £68,195 (against £53,388), making a total of £106,937, against £88,387 for the corresponding period of the previous year. The aggregate receipts to date are passenger £2,072,035 (against £1,837,817), goods £2,951,238 (against £2,581,877), making a total of £5,023,273 (against £4,419,694). Superficially, these figures indicate a satisfactory position, in relation to the results for 1940, and yet it is well known that the G.S.R. is suffering from disabilities as great as those affecting any railway administration in the world. In fact, although the G.S.R. is benefiting by the reduction in road competition due to the petrol shortage, it has had to carry on under such disadvantages that the continuance of its services, even reduced to the bare minimum, is a matter of week-to-week uncertainty. Failure to obtain sufficient quantities of steam coal of suitable quality forced the company to cease running special passenger services and to reduce very substantially its schedule of regular passenger train services. This was necessary to enable the company to provide transport for the more important goods train traffics, such as livestock, beet, grain, coal, turf, timber, milk, and other agricultural products. The coal obtainable is deficient in steam-raising properties, and has made it impossible for engine crews to run trains to schedule. This failure of engines to steam properly has resulted on occasions in serious dislocation of traffic. The inferior quality of the coal also has had the effect of increasing the consumption in lb. per engine mile by over 50 per cent. In order to keep the company's weekly consumption of coal within the limits of the quantities available it was necessary to impose three reductions in passenger train services during the year 1941. The last reduction (on



October 8) reduced the passenger train services to one train a day in each direction, with the exception of services on certain suburban lines. Since October 27 an arrangement has been in operation whereby local passenger trains of the Great Southern and Great Northern Railways operate between Howth, Drogheda, and Malahide on the Great Northern, and Westland Row, Dalkey, and Greystones on the Great Southern. Some further operating details of the arrangement are given in a letter from our Dublin correspondent, published in our Overseas columns this week at page 116.

In November last the Government of Eire issued the Emergency Powers (Great Southern Railways Company) Directions, 1941, designed to hasten the turn-round of railway wagons by limiting to one day the free period allowed to traders for loading and discharge. The Minister for Industry & Commerce in Eire has given directions as regards the operations of the G.S.R. which provide that, on and from November 19, there shall be no increase in the ordinary rail and road passenger services as at present provided, without the consent of the Minister. All rail and road vehicles and locomotives available for the carriage of goods, minerals, and livestock, have been assigned primarily to the transport of essential traffics, for which the order of priority has been fixed. The serious petrol and fuel-oil shortage, resulting in the curtailment of private and, to some extent, public road transport, placed fresh demands on the G.S.R., but up to the present it has met all its major obligations. The company operates a fleet of 122 buses for passenger services in the twenty-six counties of Eire, and 88 goods lorries for collection and delivery services and through road conveyance of merchandise traffic. As long ago as February last the company's ration of petrol for the operation of road passenger services was reduced considerably, and no petrol was allowed for the operation of special bus services. The allowance of petrol for the regular scheduled bus services was reduced by 33½ per cent., and the company has had to withdraw a number of services, particularly in areas where there were alternative rail services.

On the Great Northern Railway, traffic receipts showed a substantial improvement on the previous year, but expenditure on operations increased enormously, due to the advancing costs of coal and stores. The salaried and wages staffs received a bonus of 2s. 6d. a week in March, and, in addition, the Northern Ireland employees were granted a further bonus of 2s. 6d. as from August 1. The question of conceding the latter allowance to employees in the twenty-six counties of Eire remained for consideration by the Government. Details of the position were given at page 551 of our issue of November 28 last and page 678 of December 19 & 26. Various increases, ranging from 2s. 6d. to 3s. 6d.

a week, were also paid to the company's shop grades. The long-awaited report of the Transport Tribunal (set up in 1938) was published in July. The main recommendations of the majority report were the establishment of a National Transport Council for the review of all forms of transport during the next five years; a board of three, including a Government-appointed chairman, to govern the Great Southern Railways for a similar period; increased duties on all motor vehicles not operated by statutory transport services; prevention of lightning strikes in transport services; a Government-guaranteed debenture of £1,250,000 for the Great Southern Railways; and the pooling of competitive traffic in the Dublin area by the Dublin United Transport Company and the railways. A minority report submitted by Dr. Henry Kennedy expressed a divergent opinion. He disagreed with the principal recommendations of the majority report, and advocated State ownership of the Great Southern Railways. He also objected to anything which might restrict road transport development. For the Great Northern Railway he proposed a subsidy, and added that agreement by the two Irish Governments was necessary to the solution of the problems.

**SALVAGE OF WASTE PAPER.**—The need for the utmost co-operation of all sections of the community with the Ministry of Supply in securing the salvage of every possible scrap of waste paper remains of great importance to the war effort. One source of valuable waste paper may be found among out-of-date A.B.C. Railway Guides which weigh 23 oz. each, and each of which can be used for the production of 4 gun fuses; 10 of these books will make 8 aeroplane cannon shells. The Waste Paper Recovery Association Limited has been formed by the Newspaper Proprietors' Association Limited, the Newspaper Society, the Scottish Daily Newspaper Societies, the Paper Makers' Association Incorporated, and the Periodical Proprietors' Association Limited, with offices at Bouverie House, 154, Fleet Street, London, E.C.4. Those who experience difficulty in getting into touch with a waste paper merchant may find that their problems will be solved by direct communication with the association.

**EXPORTS TO MALAYA AND THE STRAITS SETTLEMENTS.**—The Board of Trade has made the Export of Goods (Control) (No. 1) Order, 1942 (S.R. & O. 1942, No. 35, price 1d.), which came into force on January 11. Under the terms of this Order, export licences will be required in the case of all goods consigned to the Straits Settlements and to the Malay States. The Board of Trade has also issued an Order revoking outstanding export licences for the following destinations:—British North Borneo, Gilbert & Ellice Islands Colony, Hong Kong, Malay States, Nauru, Sarawak, Straits Settlements. The Order (S.R. & O. 1942, No. 40, price 1d.) applies to all export licences for these destinations, with the exception of certain general licences held by the Crown Agents for the Colonies and a number of other official and semi-official organisations.

## Publications Received

**Man-Cooling Fans.**—An adequate supply of cool ventilating air for workers in foundries, forges, furnaces, gas works, and other hot spaces forms the range of application of the fans described in booklet No. V.201 issued by Keith, Blackman Limited, of London, N.17. The motors supplied with the fans can be three-phase, single-phase, or d.c., as required, and the fans themselves give air velocities of 100 ft. a min. at 50 to 60 ft. from the fan.

**Weld Dimensioning.**—It is not too much to say that a measurable advance in welding practice has awaited the adoption of a standard system of showing welds on drawings, akin to that used for riveting in boiler and structural steel work. A system, which on a *prima facie* view certainly seems suitable for adoption, has been evolved by Murex Welding Processes Limited, of Waltham Cross, and is explained in booklet No. M22 of that company, which is a most practical work and ought to be in the possession of all engineering undertakings doing any jobs where stress is transmitted through welds. Actually the system

described has been used by the Murex staff for some years. The text and illustrations show clearly how to give on the drawings for any stress-transmitting weld the five characteristics necessary, viz., size, type, length, nature and location. Seams not required to transmit stress are marked simply with the word "seal."

**Works Trucks.**—Small motor trucks, powered by the celebrated Douglas horizontal petrol engine, are the subject of a brochure entitled "A Source of Extra Man Power" issued by Douglas (Kingswood) Limited, of Kingswood, Bristol. It is stressed that this truck model, which has hydraulic transmission, is capable of being operated by female labour. There are low-loading, high-loading, elevating, and non-elevating models, sufficient to cover all factory requirements up to a couple of tons in weight for continuous work and with an emergency capacity of four tons.

**Aluminium Alloys.**—The many aluminium and aluminium alloy specifications which have been cancelled as a consequence of action by the war authorities have necessitated the publication of a new issue of Noral's well-known book of specifications. The information in it is complete down to

November, 1941, although the fly-leaf bears the date of June in that year. A feature which is of decided convenience for regular users of aluminium alloys is the inclusion in the numerical index of the cancelled specifications. Against each alloy is shown not only its analyses but also the various forms in which it is produced. Copies of this specification book are issued by the Northern Aluminium Co. Ltd., at Banbury.

**Data on Cast Iron.**—Information contained in the many B.S.I. specifications—over a couple of dozen in number—relating to cast iron and cast iron products are used as a basis for this useful 5s. book issued by the British Standards Institution, 28, Victoria Street, London, S.W.1, for the Iron & Steel Control of the Ministry of Supply. It deals concisely with the properties and characteristics of grey pearlitic, martensitic, austenitic, and malleable cast irons. Besides being most informative to engineers and designers, this book seems to us to have a distinct value for the thousands now employed in engineering in one or other of the Ministries, and who have had little or no previous practical experience in engineering.

## THE SCRAP HEAP

The heaviest train ever worked on the Pennsylvania Railroad is said to be one of 125 freight cars weighing 13,568 (short) tons which worked out of Cleveland on September 14, 1941, with two steam locomotives at the front and two at the back. At Ravenna the train was divided into two portions of 75 cars for Sharpsville, Pa., and 50 cars for Youngstown, Ohio.

Over 20,000 conventions, annual meetings and periodic get-togethers are held annually in the United States, according to a survey recently made by the Railway Express Agency, which serves a large number of the convocations. The movement of exhibits, some surprising in number, size and complexity, is now a highly specialised activity in express service and frequently must be carried on under marked pressure of time.—From the "Railway Age."

Comedians in Dublin are cashing in on the railway slow-down in Eire. One of the most successful of this year's pantomime sketches is that in which Jimmy O'Dea plays a porter who sends all the waiting passengers to gather logs before he will allow them to board the train. The setting is the Irish station of Ballygobackwards. There are notices like: "If you can't push, don't travel." "Friday is turf day." "Spare a sod for the G.S.R." There is also a notice

"Dublin to Cork, 4 Hours," in which the word "hours" has been stroked out and "weeks" written underneath.

The Great Northern Railway, which operates in Ulster, may yet, I am told, run a through service between Belfast and Cork. For Northern Ireland has plenty of coal. The Great Northern is already working some services in Eire by arrangement with the Great Southern Railway. Informed opinion sees an inevitable extension of this arrangement.—From "The Daily Mail" of January 14, 1942.

### SWORDFISH MAKE HEAVY TRAFFIC

New England markets dispose of a considerable portion of swordfish taken in Nova Scotian waters, according to the Canadian National Railways express department which handles large quantities of the catch. Swordfish are shipped after removal of head and sword. Four or five hundred pounds of fish fill a box. The box and the necessary ice add from three to four hundred pounds, so that a single fish in transit may represent a shipping weight of approximately nine hundred pounds.

### KIRKINTULLOCH RAILWAY

Description of a New Static Mercurial Dynamometer invented by the Author; together with an account of the Results obtained by means of this Instrument upon the Kirkintulloch Railway.

(1829.) 8vo. boards. Cloth back. 1 plate. Rare. An extract from some book or periodical. Probably the first use of an instrument to gauge the power required on a railway.—An item from a catalogue of railway literature recently issued by Grafton & Co.

November 11, 1844.—A circular of Messrs. Railton & Son, sharebrokers of Manchester, dated this day, contains some statements showing the extraordinary number of railway projects before the public. They state, that since October 14, "There have been put forth forty-one new prospectuses of railway schemes, and the shares applied for in each have far exceeded the number to be issued. Taking the above forty-one lines into the account, the following will result:—On the 14th of August upwards of ninety new lines, requiring more than £60,000,000 of subscribed capital to com-



V sign on smokebox of 4-6-0 G.I.P. engine at Delhi

plete them, were put forward, to which add the above forty-one, stating a requirement of £35,265,000, together upwards of 131, needing an investment of £95,265,000, with the power of borrowing one-third more, devoted to the same object; making a grand total of £127,020,000."—From "The Companion to the Almanac" for 1845.

### RE-ROLLING RAILS

An extract from "The Fact Book," which has been kept by the Divisional Engineer, Plymouth, G.W.R., and his predecessors for nearly a century.

Great Western Railway,  
Engineers Office,  
Swindon Works,  
January 14, 1862.

My dear Margary,

Our process of working up the old rails is as follows:—

First, a number of pieces of old rail about 3 ft. long are piled and hammered into blooms which are afterwards rolled into slabs 7 in.  $\times$  1  $\frac{1}{4}$  in.—these form the top of the rails.

Second, small piles of 3 or 4 pieces of old rail 3 ft. long are rolled into bars 3 in.  $\times$  4 in.  $\times$   $\frac{1}{2}$  in. which form the middle and bottom of the rails.

Third, slabs and bars being cut to given lengths, the latter are piled on the former and form the bloom for the rail which being heated to a welding heat is passed several times through the rolls and compressed together and is again immediately put back into the furnace and reheated to welding point—then rolled into rail.

It is I know a very general opinion that good rails cannot be made out of old rails—with this however I do not at all agree, and I shall be much surprised if the rails I send you do not prove I am right. Many argue they cannot be made sound, but I will guarantee those we make are with rare exceptions sound, and I believe better rails than the bulk of those made of new iron in the present day. I shall be glad if you can put these down where they will get the most severe trial.

Yours very truly,  
(Signed) Willm. F. Gooch.



"I've never known the 8.23 so crowded."

[Reproduced by permission of the proprietors of "Punch"]



## OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

### NETHERLANDS INDIES

#### Rolling Stock

The State Railways at the close of 1940 had 723 steam locomotives, 13 electric locomotives, 25 electric motor coaches and 26 trailers, 2,255 passenger cars, and 17,840 wagons. With the exception of 65 steam locomotives, 215 passenger cars and 1,221 goods vehicles, which are of 60 cm. (2 ft.) gauge, all the above is 3 ft. 6 in. gauge rolling stock. Purchases during 1940 included one first-class and three third-class sleeping cars, two coaches, and an ambulance car.

### CANADA

#### Combined Railways Results in 1940

For the first time since 1931 Canadian steam railways had in 1940 total operating revenues of more than \$400,000,000, and monthly reports for 1941 showed continued increases. Actually the 1940 revenues amounted to \$429,142,659, compared with \$367,179,095 in the previous 12 months. The \$400,000,000 mark was passed for the first time in 1919, and revenues stayed well above that amount until 1931, when they dropped to \$358,549,382 and continued to decline in each of the two succeeding years. With the exception of 1938, each year 1934-1940 inclusive, has shown an increase over the preceding year. Operating expenses increased from \$304,373,285 for 1939 to \$335,287,503 in 1940.

The average route-mileage operated during that year was reduced from 42,676.4 miles in 1939 to 42,601.0. Revenue freight-train-miles increased by 13.8 per cent. and passenger train-miles by 2.1 per cent., but revenue freight-ton-miles increased by 20.4 per cent. to 37,898,196,157, which has been exceeded only by the 1928 ton-miles. Passengers carried increased by 7.3 per cent. and passenger-miles by 24.2 per cent. The average passenger journey was 99.1 miles, the longest reported for any year. Passenger train car-miles, however, increased by only 4.2 per cent. The number of employees increased from 129,362 in 1939 to 135,700 or by 4.9 per cent. and the number of female employees increased from 4,798 to 6,229 or by 30 per cent., probably an effect of the war.

#### The Railway Club, Montreal

For the year 1942 Mr. William Baird, Steamship Passenger Traffic Manager, Canadian Pacific Railway, has been elected President of the Canadian Railway Club, Montreal. This club, which was formed in 1903, and was incorporated in October, 1913, is composed of officers and staff of transportation companies throughout Canada, including railway, steamship, air line, express, and telegraph undertakings, and railway supply companies. At present the club has an active membership of over 1,500, located throughout Canada and the U.S.A. The object of the club is "the advancement and dissemination by means of reports, papers, investigations, and discussions, of knowledge concerning the construction, operation, and maintenance of railroads and railroad equipment, and the cultivation of sociability among its members." Papers of a high standard are presented to meetings held in the Windsor Hotel, Montreal, on the second Monday of every month excepting June, July, and

August. Official proceedings in the form of a magazine are issued immediately after the meetings for nine months in the year, but, of course, there are no issues during the summer months when meetings are suspended. The 39th winter season of the Canadian Railway Club was inaugurated on September 19 last, with the usual smoking concert, at which some 400 members were present. Mr. Baird's immediate predecessor in the presidency was Mr. F. N. Wiggins, General Superintendent, Canadian National Express Company, and during 1941 Mr. Baird himself was First Vice-President.

#### An 800-ton Bridge Span Placed in Position

On Sunday, November 23 last, a good piece of work was carried out on the busy Montreal-Toronto main line of the Canadian National Railways, when an 800-ton double-line girder bridge span was rolled into position at Dorval by staffs of the C.N.R. and Dominion Bridge Company jointly. The time taken was 6 hr. between the passage of the last train over a temporary span and the first over the new bridge, despite the fact that there was a continuous fall of snow and rain throughout this period.

The span is also the first of its kind to be designed and fabricated in Canada, and embodies several innovations introduced by C.N.R. bridge engineers. A saving of some 150 tons of structural steelwork was effected by the use of a reinforced-concrete floor in place of the familiar steel sections or decking.

The span, which is 125 ft. long and 31 ft. wide, carries the railway over the new Trans-Island Boulevard. It was erected on staging beside the line, lowered on to rollers, and hauled into position with winches on the ground below. The design and fabrication were supervised by Mr. C. P. Disney, Bridge Engineer, Central Region (Toronto), and the slewing was supervised by Messrs. W. Murray and W. E. Bell of the Dominion Bridge Company. The substructure construction was carried out under Mr. K. Huffman, Construction Engineer, Central Region and Mr. E. Gohier, Chief Engineer, Quebec Department of Highways.

### UNITED STATES

#### A Chapter of Accidents

A number of accidents occurred in the U.S.A. in November, 1941, causing the deaths of 23 persons and injuries to many others. As briefly recorded on page 514 of our November 14 issue, the Pennsylvania Railroad Chicago-New York express, the Pennsylvanian, was derailed on the night of November 9 when passing through Dunkirk, Ohio. A cylinder head from a locomotive hauling a freight train in the opposite direction on the adjoining track blew out and fell in front of the express. The locomotive and seven of the eight cars were derailed and overturned. The derailed locomotive struck a signal box, demolishing it, and the tracks of both the Pennsylvanian and the New York Central, which crosses the former near the spot, were blocked. Thirteen persons, including the fireman, were killed and 44 injured.

On the Southern Pacific Railroad a 96-car freight train became stalled in the Hasson tunnel, California, on November 19,

when a coupler broke. The driver, fireman, brakeman, and two trespassers were suffocated when the train caught fire from sparks from the locomotive.

Two persons were killed and 80 injured when 9 of the 12 cars of the northbound Seminole of the Illinois Central, were derailed, and 8 fell down a 33-ft. embankment, one mile south of Corinth, Miss., on the evening of November 23. A transverse fissure in a rail is reported to have been the cause.

One of the Texas Zephyrs of the Colorado & Southern and Ft. Worth & Denver City (subsidiaries of the Burlington) was derailed on the outskirts of Dallas, Texas, on November 20, when a lorry carrying steel girders crossed the line in front of the train. The engine driver and the driver of the lorry were killed and six passengers were injured. The steam locomotive and two of the seven cars of the train were thrown across the track but remained upright. Normally this is a diesel train.

On November 27 two New York-Florida trains of the Atlantic Coast Line were derailed in separate accidents, one near Hortense, Georgia, and the other at Dover, Florida. Seven cars of the diesel streamliner, Tamiami Champion, were overturned and one person was killed when the train left the line about 6 a.m. About the same time the Havana Special of 7 cars was derailed, 3 cars being overturned. Eight persons were injured.

#### Open Bridge Derailment, B. & O. RR.

On December 3, the first part of the Baltimore & Ohio Railroad diesel-electric Shenandoah, on the Chicago-New York run is said to have passed signals at danger and was derailed at a derail protecting the Indiana Harbor Ship Canal bridge, which was open for navigation at the time. The first section of the locomotive plunged into the canal and the motorman was killed. He was alone in the cab at the time. The engine is said to have been reversed, but, nevertheless, the derailment occurred at a speed of 30-40 m.p.h. No other vehicles went into the canal and no passengers were injured.

### GERMANY

#### Nationalisation of an Austrian Railway

A private railway undertaking in Lower Austria, the Ruprechtshofen-Gresten Railway, was taken over by the Reichsbahn on January 1, 1942. The company owned a 36 km. (22½ mile) 3 ft. 6 in. gauge branch line of a system of narrow-gauge lines based on St. Polten, a station on the Vienna-Linz main line. This narrow-gauge system was leased by the Reichsbahn, and the branch line now taken over was operated by the Reichsbahn under an agreement with its owners.

#### The Reichsbahn in 1941

According to a preliminary survey, the earnings of the German State Railway for the past financial year were 18 per cent. higher than for the previous year, namely, RM.9,000 million against RM.7,600 million. The rise is attributed to increases in traffic and the extension of the State Railway system to occupied territories. Expenditure has naturally increased also, but, after allowing for larger writings-off and payments to the State, the result of the year's working shows a surplus large enough to cover all the expenditure appearing in the profit and loss account. If earnings and expenditure balance each other, says the Official German News Agency, the payments to the Reich Treasury, and the traffic tax (which is made over to the

Reich), will not be considerably higher than for 1940, as a result of larger traffic earnings.

The capital account includes development works, new railway installations and rolling stock, and the redemption of debt, and it is noted that the existing loan and credit funds and the railway's own cash funds are sufficient for financing requirements. The Reichsbahn cash funds are managed through the Deutsche Verkehrs-Kreditbank, the balance of which exceeded RM.1,000 million in 1940. The result of the conversion of the RM.150 million falling due on September 1, 1941, of 4½ per cent. Reichsbahn bonds of 1935 into 3½ per cent. bonds redeemable in 1966, is described as extremely satisfactory, notices of conversion of RM.148.4 million being received in a few days. The general debt situation is also considered good. Long-dated obligations amount to about RM.4,000 million, but the value of the railway property at the beginning of 1941 is placed at nearly RM.40,000 million, and capital at RM.20,200 million.

## ITALY

### State Railways Rolling Stock

At the end of the financial year, June 30, 1940, the locomotive, carriage, and wagon stock of the State Railways consisted of the following:—

4,117 steam locomotives
1,602 electric locomotives
776 diesel railcars
8,074 coaching vehicles
4,505 baggage and postal vans
130,500 goods wagons and a number of special vehicles

On that date there were also under construction the following:—

146 electric locomotives
141 diesel railcars
91 electric motor coaches
121 coaching vehicles, and
2,744 goods wagons.

## BRAZIL

### Traffic Control on the Central Railway

The Central Railway has decided to instal traffic control between Santos Dumont, Lafayette, and Bello Horizonte, and the purchase of the necessary equipment from America has been sanctioned, a maximum cost of \$1,571,000, payable in New York in 14 half-yearly instalments, being the limit of the sanction.

### Rêde Mineira de Viação

The present Rêde Mineira de Viação is the outcome of the fusion of three railways, namely, Rêde Viação Sul Mineira—previously administered by the State; Estrada de Ferro Oeste de Minas—previously a Federal Railway under State concession; and the Estrada de Ferro Paracatu.

On March 1, 1931, the Minas State Governor effected the fusion, in accordance with a clause of the contract governing the lease of the Estrada de Ferro Oeste de Minas, and thus centralised the administration and pooled the interests of three railways which, geographically and politically had everything in common. The fusion had also the effect of furthering at least one part of the Federal Government's National Highways' Plan, namely, that of offering through communication from the sea coast at Angra dos Reis to the hinterland by way of junctions with the Mogiana Railway, Central Railway, and Estrada de Ferro de Goyaz. Only 23 km. of line, from Monte Carmello remain to be built to join up this last named railway with the Rêde Mineira de Viação at Ouidor.

At present 181 km. of line are electrified between Barra Mansa and Andradina, and

the electrification of a further 108 km., between Barra Mansa and Angra dos Reis is in hand. On this new undertaking the railway has already spent a sum of 60,000 contos of reis, and a further 46,400 contos have been expended in the stone-ballasting of 2,731 km. of track.

The railway's principal workshops are situated at Divinópolis, though smaller carriage and wagon building shops are at Cruzeiro. The Divinópolis shops are already capable of turning out 100 locomotive wheels a week, and cylinders, points, signalling apparatus, and platelaying tools are also produced. A carriage and wagon repair shop is installed at Lavras, and electric locomotives are repaired at Barra Mansa; 76-cm. gauge stock is overhauled at São João del Rei.

### Rio Grande do Sul New Lines

Four new lines are in course of construction in the State of Rio Grande do Sul. One, between Santiago and Cerro Azul, via São Luiz, has already 60 km. of track open for traffic, and 54 km. remain to be completed. A second line between Dom Pedrito and Santana do Livramento is also nearing completion, though recent heavy floods have retarded the work. From Pelotas to Santa Rita yet another line was begun last year, and it is expected that the first 70 km. to Cangussú will be completed by the end of this year. Lastly, between Caxias and Rio Negro, surveys have been carried out from Rio Negro to Lages, in the State of Santa Catarina, and 25 km. are already open for traffic.

### Railway Facts and Figures

The first law relating to railways in Brazil was sanctioned by the Regent, Diogo Feijó, on October 31, 1835, and 23 years later was the first railway, 14 km. long, opened for traffic. In 1876, the total length of line had reached 2,122 km., and when the Republic was proclaimed in 1889, Brazil possessed 9,973 km. of railways. This total increased to 26,062 km. in 1914, and to 34,207 km. in 1938, and of this total, 12,871 km. were controlled by the Federal Government, 10,458 km. by State Governments, and 10,878 km. by private owners. Of the total of 34,207 km., 30,745 km. were of metre gauge, 2,075 km. of 1-60 m., and the rest of gauges ranging from 60 cm. to 75 cm.

Receipts for all railways in 1934 totalled 819,677 contos of reis, and expenses were 728,109 contos. In 1939 these totals were 1,199,860 contos and 1,199,772 contos respectively.

In 1934 railways consumed 595,337 tons of foreign coal and 292,678 tons of national coal, in addition to 6,388,989 cu. m. of wood fuel. These figures increased to 754,364 tons, 451,814 tons and 9,028,261 cu. m., respectively, in 1939. Fuel expenses were 122,718 contos in 1934 and 255,881 contos in 1939.

Of railway route-kilometrage by States, it is found that Minas Geraes, with 8,158 km. possesses the greatest length of line. São Paulo occupies second place with 7,464 km., and Rio Grande do Sul third place with 3,485 km. Rio de Janeiro and Bahia both have more than 2,000 km. of line, but somewhat less than 3,000 km. Paraná, Ceará, Santa Catarina, Matto Grosso, and Pernambuco all have more than 1,000 km., but less than 2,000 km. All the other States have less than 1,000 km., the great areas of the States of Goiás and Amazonas possessing only 385 and 5 km. respectively.

There are four railways in Brazil with more than 3,000 km. of line, namely, the Rêde Mineira de Viação with 3,981 km.; the Viação Ferreira do Rio Grande do Sul with 3,347 km.; the Central Railway with

3,175 km.; and the English-owned Leopoldina Railway with 3,068 km. Classified with more than 2,000 km. there are the Oeste de Minas Railway with 2,568 km.; the Rêde Paraná-Santa Catarina with 2,065 km.; and the Sorocabana Railway with 2,141 km.

## EIRE

### Through Services between G.N.R. and G.S.R.

By co-operation between the Great Northern and Great Southern Railways, through running of certain trains between the two systems in the Dublin area was inaugurated on October 27 last. This enables passengers from such places as Drogheda, Howth, Donabate, and Malahide on the G.N.R. to travel via Amiens Street to Tara Street, Westland Row, Dalkey, and Greystones on the G.S.R. But its greatest advantage is that business people coming from these G.N.R. stations in the morning can go straight through to Tara Street and Westland Row, which are near the centre of the city, instead of having to alight at Amiens Street—the G.N.R. terminus—and go on by bus to O'Connell Bridge or other points in the business area. The same remarks reversed apply to the return business traffic from the centre of the city to G.N.R. stations in the evening. The following is a list of the through workings in force:—

	a.m.		p.m.	
Drogheda ...	7.40	8.05	—	—
Howth ...	—	—	8.25	9.02
Malahide ...	—	—	—	8.30
Donabate ...	—	—	—	4.55
Amiens Street ...	8.35	9.00	8.42	8.54
Westland Row ...	8.42	9.06	8.49	9.00
	(A)	(B)	(D)	(E)
Dalkey ...	—	—	9.09	9.57
	—	—	(C)	(F)
Greystones ...	—	—	—	8.45
	—	—	—	(G)

(A) Stock returns empty to Amiens Street: G.N.R. stock.

(B) Stock returns empty to Amiens Street: G.N.R. stock.

(C) Returns as the 9.22 Dalkey to Amiens Street: G.N.R. corridor stock.

(D) Stock returns empty to G.N.R.: G.N.R. corridor stock.

(E) Is formed of G.S.R. stock, which runs as the 7.10 a.m. from Westland Row to Dalkey, returning as the 7.50 Dalkey to Amiens Street (8.20), and then as the 8.44 Amiens Street to Howth. On arrival at Dalkey it forms the 10.05 Dalkey to Westland Row.

(F) Formed of G.S.R. stock, which has worked as the 4.25 Amiens Street to Donabate. Saturdays excepted.

(G) Is worked with the G.S.R. stock which has worked the 6.20 from Westland Row to Howth.

	p.m.	
Greystones ...	4.15	—
Dalkey ...	—	5.35
Westland Row ...	5.05	5.32
Amiens Street ...	5.10	5.40
Donabate ...	5.42	—
	(H)	—
Howth ...	—	5.59
	—	(I)
Drogheda ...	—	7.07
	—	(J)

(H) G.S.R. stock which works back as the 5.46 from Donabate to Amiens Street (6.16) and continues as the 6.33 thence to Dalkey (ordinary link). Saturdays excepted.

(I) G.N.R. stock, worked as the 4.25 empty stock from Amiens Street to Westland Row. Saturdays excepted.

(J) G.N.R. stock: works as the 4.53 Amiens Street to Dalkey. Saturdays excepted.

(K) G.S.R. stock: returns from Howth as the 7.10 to Greystones.

It is of interest to note that, to save time, engines are not changed at Amiens Street, G.N.R. engines working their own stock over G.S.R. metals, and G.S.R. engines theirs over G.N.R. lines.

This is not the first occasion upon which through running via Amiens Street has been in force. About 30 years ago there was a through service between Howth and Kingstown (Dun Laoghaire).



## SOUTHERN RAILWAY MIXED TRAFFIC ELECTRIC LOCOMOTIVE

*Maintains drawbar pull when passing over conductor rail gaps*

THE Southern Railway has recently produced the first of a new type of electric locomotive, designed by Mr. Alfred Raworth, Chief Electrical Engineer of the Southern Railway, for the operation of both freight and passenger services over the company's electrified lines. The mechanical parts of the locomotive have been constructed in the company's works at Ashford to the design of Mr. O. V. Bulleid, Chief Mechanical Engineer. The locomotive has recently completed technical test runs on the main Brighton line and will shortly commence service trials with passenger trains by day and with freight trains by night. The machine is capable of dealing with freight trains of 1,000 tons in weight and can also haul passenger trains at speeds up to 75 miles an hour.

together with a speedometer and all the necessary instruments associated with the electrical, braking and steam heating equipment.

Current is collected from the conductor rail by shoes of which four are mounted on each side of the locomotive and there is a pantograph mounted on the roof for collecting current from overhead wires, which it is intended to install in certain sidings. The controller has 26 positions for controlling the voltage applied to the traction motors. Each position is a "running" position which can be used for any length of time, thus giving very smooth acceleration and a large number of "running" speeds. A novel feature embodied in the design of the electrical equipment enables the locomotive to continue exerting a drawbar pull when pass-

*Mixed-traffic electric locomotive with passenger train of 14 bogie coaches*



The locomotive consists of a box type cab carried on two six-wheel bogie trucks. Each of the six axles is driven by an electric motor through single reduction spur gearing. The box cab contains an electrically fired boiler for supplying steam for heating passenger trains as well as electrically driven compressors and exhausters for operating the brakes—it also contains the electrical apparatus for controlling the traction motors. At each end there is a motorman's driving cab containing his controller and the brake operating levers.

ing over the unavoidable "gaps" in the conductor rail which occur at junctions and crossings when none of the collector shoes may be in contact with the conductor rail.

On Monday last press representatives were invited to a demonstration run of a passenger train drawn by the first of these electric locomotives. The company was represented by: Mr. A. Raworth, Chief Electrical Engineer; Mr. R. M. T. Richards, Traffic Manager; Mr. S. W. Smart, Assistant for Train Services; and Mr. C. Grasemann, Public Relations & Advertising Officer.



*Mixed-traffic electric locomotive with freight train*

## STANDARD RAILWAY BRIDGES

*A standard design has been adopted by the British railways for use in replacement of damaged underbridges*



*Track view of new standard railway underbridge*

**I**N certain instances, fortunately very few in number, the bombs which have been dropped by enemy action have so severely damaged the metalwork of railway bridges that the permanent replacement of the spans has become necessary. The railway companies have now obtained a supply of standard spans which can be used for replacing such bridges, and these are designed to fit any opening between 40 and 80 ft., as well as being adaptable for any angle of skew.

Immediately after damage to a bridge by enemy action has occurred the damaged structure is removed if this is necessary, and the railway tracks are carried on temporary bridging built up of waybeams supported on trestles from the road or ground beneath, as shown in Fig. 1.

The first permanent standard bridge to be erected on British railways is on the Southern Railway, about five miles from the centre of London, where the temporary bridgework was replaced by the permanent structure. The method of carrying out the work was as follows:—

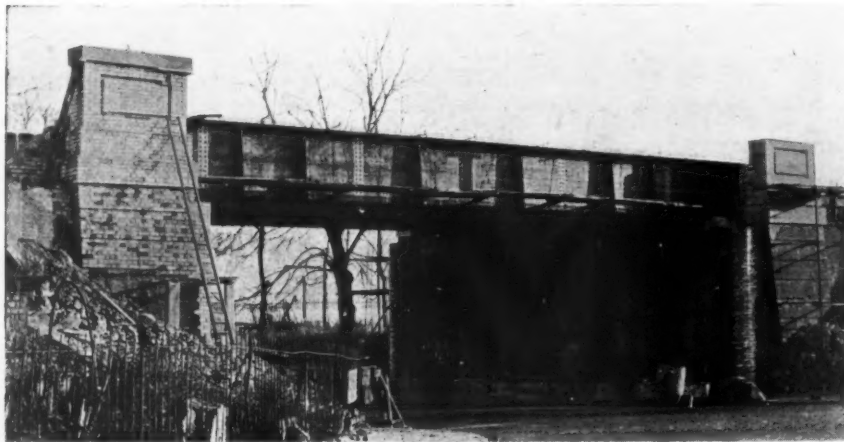
The tops of the abutments at the bridge were opened out to ascertain their thickness and condition, and new concrete bearing blocks for the new main girders were built into position

between the temporary waybeams. In order to ensure the work coming together properly at site during the very limited time which was available for erection purposes, the steelwork was previously assembled elsewhere. The bridge platform is composed of rolled joists forming the cross girders, and the floor of the bridge is of concrete in which the joists are embedded. Slabs consisting of three joists with their surrounding concrete were pre-cast, and to ensure correct final alignment the concrete was cast when the cross girders were temporarily bolted to the main girders at the assembly site.

During final erection the centre girder and the slabs for one track were placed in position by cranes with the inner ends of the slabs resting on the new centre main girder, their outer ends being supported on a light trestle, slightly above their final position. When the outer girder had been landed on the abutments and moved in sideways by means of the cranes, the outer ends of the slabs were lowered down by jacks on to the flange of the outer main girder, and the connections between the cross girders and the main girders bolted up. The erection of the girders for one track was begun on a Sunday about 8 a.m., and this half of the span was completed ready for riveting shortly after 11 a.m. (Fig. 2).

Temporary longitudinal timbers, sawn to the required thickness, were then placed on the top of the concrete slabs, and the permanent way was secured to these. The cross girder and connections were then riveted to the outer girder immediately after the track had been replaced. On the following Sunday the other outside girder and the slabs under the second track were similarly placed in position and the floor completed, as described above.

The concreting up of the space between the pre-cast concrete slabs and the webs of the main girders has been carried out under possession, as opportunity offered, and the sealing of the joints in these slabs, and the ballasting of the tracks, will shortly be completed (Fig. 3).



*Standard railway underbridge as erected on the Southern Railway*



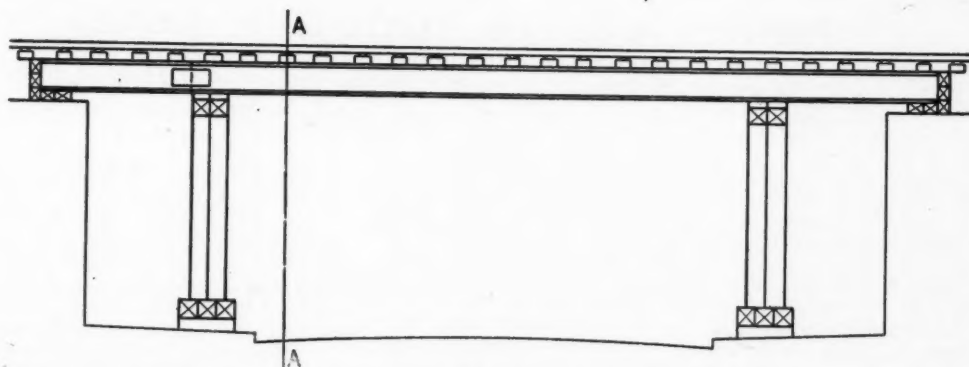


Fig. 1—Longitudinal section (above) of temporary bridge, with section at AA on left

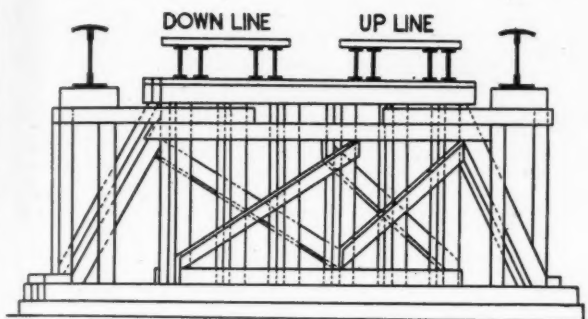


Fig. 2 (below)—New bridge during erection. Longitudinal section through precast concrete floor, with cross section at AA

CROSS SECTION A-A

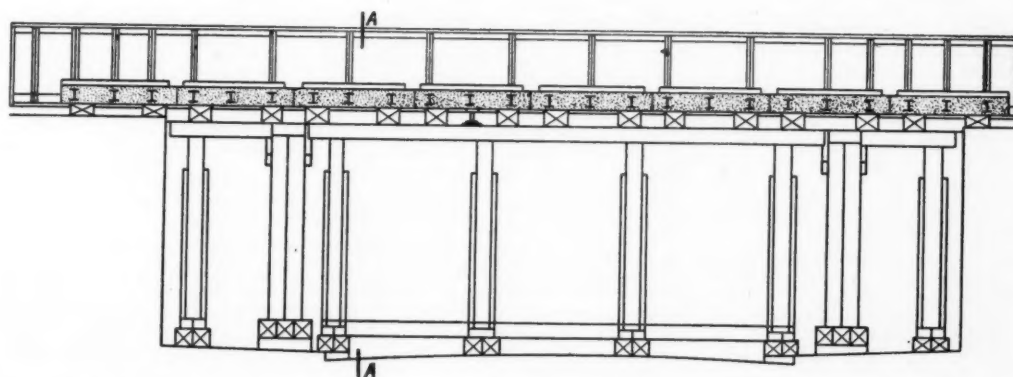
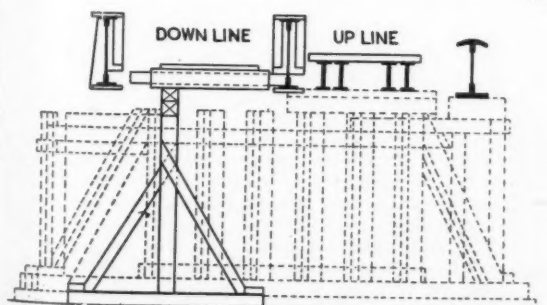
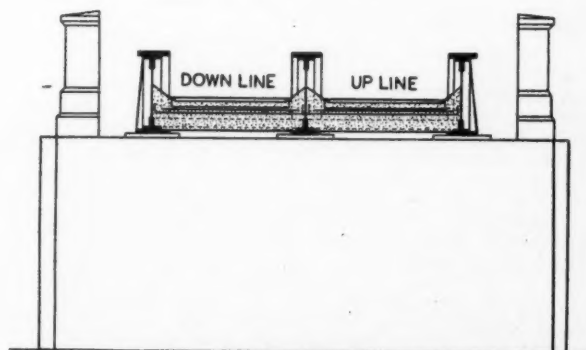


Fig. 3—New bridge after erection



STANDARD RAILWAY BRIDGES

(See article opposite)



## SEVEN YEARS OF CONTINUOUS WELDED RAIL

*A review of experience to date on the Delaware & Hudson Railroad with long lengths of butt-welded track compared with jointed track*

SEVEN years have now elapsed since the first section of continuous butt-welded rail in long lengths was installed on the Delaware & Hudson Railroad, and from time to time we have published in THE RAILWAY GAZETTE descriptions of this remarkable development in permanent way practice.\* The pioneer of this form of track was the late H. S. Clarke, who was Engineer, Maintenance of Way, of the Delaware & Hudson, at the time of his death in 1938. Mr. Clarke made his first installation of butt-welded rail in 1933, and since then more than 40 separate applications have been made in the U.S.A., under various track conditions, on 12 different and widely-separated railways. Of these installations, 12 are on the Delaware & Hudson, and comprise a total of 446,024 ft. of rail and 10,984 butt-welded joints.

Mr. Clarke claimed many advantages in favour of indefinitely long rails in lengths to be limited only by necessary

R.E. rail was used. The longest continuous stretch of rail is 7,018 ft. All the rail is, of course, flat-bottom.

## Failures and Their Causes

Of the 10,984 welded joints, there have been only 29 failures, of which 25 occurred in thermit welds and four in flash welds. The number of failures represents less than 0.26 per cent. of the welded joints. The failures experienced in thermit welds fall roughly into four classes as follows:—

(1) Improper design and lack of accurate control of the pre-heating temperature. Failures of this type have all occurred in the installations made in 1933, 1934 and 1935, and their cause has been eliminated by improvements in the design of the weld and by accurate control of the pre-heating temperature.

(2) Many failures due to improper welding technique. These are attributed to excessive pre-heating at the time of welding.

(3) Failures due to defects already present in the rail.

(4) Failures due to the use of an improper type of thermit. In other

TABLE I—PARTICULARS OF CONTINUOUS WELDED RAIL, DELAWARE &amp; HUDSON RAILROAD

Location	No. of Welds		Lin. ft. of Welded Rail		Type of Ballast	Year Laid	Track†	Heaviest Drivers (lb.)	Max. Speed m.p.h.	Total Tonnage to Date
	Thermit	Flash	Thermit	Flash						
Albany ... ..	316	—	12,075	—	Crushed stone ...	1933	N	32,083	20	51,554,655
Mechanicville ... ..	254	—	10,071	—	" ...	1934	N	32,083	35	44,921,625
Schenectady ... ..	551	70	18,218	5,356	" ...	1935	S	34,425	30	20,853,456
Windsor ... ..	281	—	19,286	—	" ...	1935	N	34,425	30	19,940,089
Cohoes ... ..	74	—	3,035	—	" ...	1936	N	34,425	30	52,710,774
Comstock ... ..	409	—	16,044	—	" ...	1936	N	34,425	30	56,382,984
Schenectady ... ..	1,559	874	62,010	34,900	" ...	1937	S	32,083	75	33,013,265
Pt. Henry ... ..	98*	1,987	—	82,527	" ...	1937	S	34,425	20	15,011,649
Harpursville ... ..	65*	1,142	—	51,370	Ore sand ...	1937	X	32,083	65	14,510,844
Bainbridge ... ..	47*	513	—	21,120	Cinders ...	1937	N	34,425	60	25,730,645
Watervliet ... ..	53*	1,622	—	66,487	Cinders ...	1937	N	32,083	65	22,338,477
Plattsburg ... ..	—	1,069	—	43,523	Stone and cinders	1937	N	32,083	65	33,543,220
					Ore sand ...	1939	N	32,083	65	31,306,892
							S	32,083	65	41,511,432
Totals ... ..	3,707	7,277	140,740	305,284						25,454,607
										10,007,766
										9,673,950
										5,232,850
										4,549,700

\* Closure welds only.

† N = Northbound,

S = Southbound,

X = Single line.

breaks for signal circuits and switches. These advantages he listed as follows:—

- (1) The lower cost of track maintenance, particularly at the joints.
- (2) Longer life of the rail, resulting from the elimination of joint batter.
- (3) Savings in rail-laying expense owing to the increased life of rail.
- (4) Better conductivity in track circuits.
- (5) Elimination of the necessity of bonding joints.
- (6) Savings in the maintenance of rolling stock and motive power.
- (7) Smoother riding track resulting from the elimination of pounding at the joints.
- (8) Lower cost of maintaining alignment and surface, owing to the elimination of creepage and its effects.

"In fact," he said, "the advantages of welded track are so many and far-reaching that we cannot afford to overlook them when, as at present, economies in maintenance are so necessary, while, at the same time, improved track conditions are essential." Mr. Clarke admitted certain objections to the use of indefinitely long rails; some of which were: (1) necessity of removing all rails in a given heat if an excessive number of transverse fissures should develop in that heat; (2) necessity of removing broken and defective rails; and (3) problems presented in the handling of continuous rail taken from the track.

Mr. P. O. Ferris, Chief Engineer, Delaware & Hudson Railroad, Mr. Clarke's successor, in a paper to the Metropolitan Maintenance of Way Club of New York recently, reviewed seven years' experience with continuous welded rail, and the essential information regarding the 12 installations on his line is given in Table I. All the installations were made with 131-lb. R.E. rail, except that at Albany, where 130-lb.

words, a type of thermit was used which did not develop sufficient heat to effect a full and complete head weld.

Failures in flash welds fall into three groups, as follows:—

(1) Those caused by the presence of zinc in the weld. These failures resulted from the use of galvanised iron shims for aligning the rail ends at the time of welding. The use of these shims has been discontinued.

(2) Failures caused by burned spots in the edge of the rail base. This burned spot was formed as a result of arcing between the rail and the contact in the welding machine at the time of welding. The condition causing it has been corrected.

(3) Failure due to a flaw already present in the rail.

Most of the failures have occurred in thermit welds and it is quite natural that this should be so. The pioneering was started with thermit welds on an experimental basis, not only to determine if the butt-welding of rails in long lengths was practicable, but also to determine the requirements of a practicable and satisfactory welded joint. The installation made in 1933 at Albany apparently was convincing in so far as it indicated the feasibility of welding rails into long lengths, but neither the Delaware & Hudson Company nor the Metal & Thermit Corporation was entirely satisfied with the joints.

The Metal & Thermit Corporation in 1937 made a further change, which resulted in a much improved design. This design consisted of a thermit collar that not only covered the base and web of the rail, but also included the underside of the head. The head proper, of course, was pressure-welded, as in all previous designs. Pre-heat temperatures were determined by the optical pyrometer, as had been done in 1936. This design is called the "K" type weld, and appears to be entirely satisfactory.

Up to the present time the welded joints have been standing up satisfactorily, even though the earlier types were made to

\* THE RAILWAY GAZETTE, February 15, 1935, p. 278; March 6, 1936, pp. 433 and 447; October 15, 1937, p. 634; March 3, 1939, p. 357.



TABLE II—COMPARATIVE MAINTENANCE COSTS—CONTINUOUSLY-WELDED RAIL V. JOINTED RAIL, D. &amp; H.R.

Location: Champlain Division—Vicinity of Port Henry, N.Y.

Period: December, 1938, to November, 1940, inclusive

Test Stretches: 7.9 miles continuously-welded rail—17.0 miles jointed rail—Tonnage, 8,500,000 annually

Tonnage since laid: Jointed rail—46,000,000; Continuously-welded rail—31,300,000

Maintenance Items	Total Man-Hours		Man-Hours per Track-Mile					
	Jointed Rail	Welded Rail	Jointed Track			Welded Track		
			24 Months	Per An.	Per An. per M.G.T.	24 Months	Per An.	Per An. per M.G.T.
Patrolling and inspection ...	67	33	3-94	1-97	0-23	4-18	2-09	0-25
Lining and surfacing ...	5,576	1,866	328-94	164-47	19-30	236-20	118-10	13-89
Gauging ...	1,070	41	62-94	31-47	3-70	0-57	0-28	0-03
Tightening jointed bolts ...	434	41	25-52	12-76	1-50	5-20	2-60	0-31
Renewing insulated joints ...	53	119	3-11	1-55	0-18	15-12	7-56	0-89
Renewing bolts and clips ...	65	84	3-82	1-91	0-22	10-70	5-35	0-63
Tightening bolts and clips ...	166	379	9-76	4-88	0-57	48-00	24-00	2-82
Sucking rail account of expansion ...	—	40	—	—	—	5-06	2-53	0-30
Replacing account expansion ...	—	75	—	—	—	9-50	4-75	0-56
Applying M. & L. clips ...	4	9	0-2	0-1	0-01	1-14	0-57	0-07
Totals ...	7,435	2,652	437-29	218-64	25-71	335-67	167-83	19-75

an imperfect design, and welding technique was then more or less in the experimental stage. Sperry detector machines are annually run over the welded section of track on the Delaware & Hudson, but so far no fissures have been found.

Besides the failures which have occurred in certain welds themselves, bolted joints joining welded sections together or to lengths of standard jointed track have occasionally failed, usually by bolts shearing. Such failures are attributed to the temperature conditions prevailing when the rail was laid, and to inaccuracies in bolt-hole drilling. For example, some holes were so drilled that the entire stress fell on only one, or perhaps two, of the bolts in a four-hole fishplate. The replacement of four-hole plates with six-hole plates, and the use of accurately-drilled rail have eliminated this type of failure. When a failure occurs in a butt-welded rail it has been found quite a simple matter to cut out all the faulty section of the rail, and insert a closure of equivalent length, which is jointed to the adjacent sections.

Test sections of track have been established for the purpose

annum per mile for each item of track maintenance for the two different types of construction. The test section near Port Henry is the better of the two, in that, since this test is located on single line, with the two types of construction adjoining each other, the annual tonnage carried and the speeds of trains operating over the two parts of the section are identical. Although they are not conclusive, the results so far obtained at Port Henry are indicative of what may be expected of welded rail as compared with jointed rail. The tests are to be continued, but the data so far indicate that the forecasts made by Mr. Clarke are correct.

As to the problem of handling released butt-welded rail, it is not expected that this will arise for many years to come, although there should be no difficulty in solving it. Several years ago approximately 43,000 lin. ft. of rail in 1,400-ft. lengths from a stock pile were loaded and transported on two trains of flat cars to a point 145 miles away, where they were unloaded and installed in the track, thus demonstrating that there is no great problem in handling these long rails.

TABLE III—COMPARATIVE MAINTENANCE COSTS—CONTINUOUSLY-WELDED RAIL V. JOINTED RAIL

Location: Susquehanna Division—Vicinity of Schenectady, N.Y.

Period: January, 1938, to November, 1940, inclusive

Test Stretches: 11.2 miles continuously-welded rail—131 lb. R.E. section

11.2 miles jointed rail—130 lb. R.E. section

Tonnage: Northbound track (jointed)—4,500,000 gross tons annually

Southbound track (welded)—9,000,000 gross tons annually

Tonnage since laid: Jointed—133,100,000-148,000,000\*

Continuously-welded—33,500,000-52,700,000\*

Maintenance Items	Total Man-Hours		Man-Hours per Track-Mile					
	Jointed Rail	Welded Rail	Jointed Track			Welded Track		
			35 Months	Per An.	Per An. per MGT	35 Months	Per An.	Per An. per MGT
Patrolling and inspection ...	3,230	2,308	288-4	98-9	6-82	206-1	70-5	7-83
Lining and surfacing ...	12,682	3,455	1,132-0	388-1	26-76	308-0	105-6	11-73
Gauging ...	15	—	1-3	0-4	0-03	—	—	—
Tightening jointed bolts ...	456	—	40-7	13-9	0-96	—	—	—
Tightening M. & L. clip bolts ...	455	600	40-6	13-9	0-96	53-6	18-4	2-04
Tightening screw spikes ...	100	294	8-9	3-1	0-22	2-6	0-9	0-10
Shimming ...	73	—	6-5	2-2	0-15	0-3	0-1	0-01
Checking expansion ...	16	—	1-4	0-5	0-03	—	—	—
Applying joints ...	130	—	11-6	3-9	0-27	—	—	—
Changing ties ...	40	112	3-6	1-2	0-08	10-0	3-3	0-37
Totals ...	17,197	6,508	1,535-0	526-1	36-28	580-6	198-8	22-08

\* Two tonnage figures are shown here for each type of track to indicate the tonnage carried by rail laid at different times. Specifically, for jointed track the higher tonnage covers rail laid in 1930, while the lower figure applies to rail laid in 1931. For continuously-welded track the higher figure is for rail laid in 1935, while the lower figure applies to rail laid in 1937.

of comparing the maintenance costs of jointed and welded track, particulars of which are given in Tables II and III.

Two sections are under observation at the present time, in each of which the welded and jointed track embody physical conditions as nearly identical as possible. One section comprises 11.2 miles of 131-lb. welded construction and 11.2 miles of 130-lb. jointed construction, with identical fastenings and stone ballast. The other comprises 7.9 miles of welded construction and 17 miles of jointed construction, with identical fastenings and cinder ballast. Careful records are kept of the maintenance expenditures on each test section, from which it is possible to show the man-hours expended per

The initial costs of installing butt-welded rails on the Delaware & Hudson Railroad were high. For example, in the standard fastening a large sole-plate with two spring clips is used under each rail at every sleeper. Since the elimination of joints has the effect of eliminating creep, it is considered that this amount of holding power is not necessary, for if the rail is well anchored at the ends, little, if any, trouble due to changes in temperature should be experienced. Moreover, since the practice of butt-welding rails is past the experimental stage, the cost has been reduced.

(See illustration on page 131)

## LOCOMOTIVE WEIGHT DISTRIBUTION—II

*Tank engines and special cases are considered in this instalment*

By GEORGE W. McARD

IN dealing with tank engine design, however, it is not sufficient to consider merely the fully loaded weights, but in addition the loads prevailing as the water and fuel are consumed. Different engineers stipulate different values, some calling for the loadings with all water and fuel supplies exhausted. More generally the loads prevailing with 25 per cent. water and fuel still unconsumed are accepted, and this would appear to be the more reasonable view to take. The following method is employed for obtaining the variations due to this cause, and Fig. 7 gives its application to the 2-6-4 locomotives under consideration:—

First ascertain the weights to be deducted, and the position of these relative to the wheelbase. Treat the engine frame as a rigid girder, and ascertain by how much the reaction at each outer support is affected by the removal of these weights. A diagram (Fig. 6) can now be drawn with the vertical values at each end representing the deducted reactions, these values being drawn to a scale of 0.1 in. a ton of load removed. The horizontal distances are drawn to the same scale as the locomotive wheelbase, and the

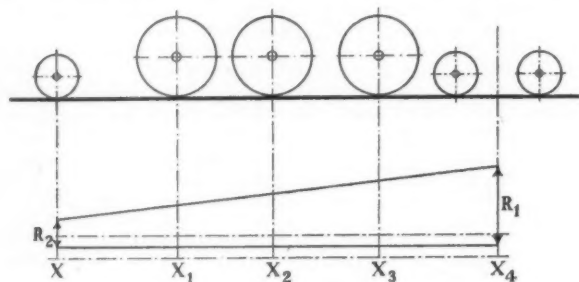
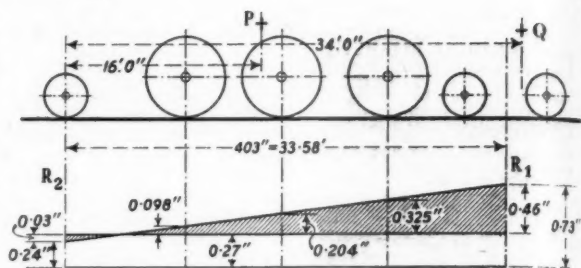


Fig. 6

distances  $X$ ,  $X_1$ ,  $X_2$ ,  $X_3$ , etc., will represent the actual amount of deflection added to the springs at each point. Knowing the deflection a ton of each set of springs, that is truck, coupled and bogie, we can ascertain the total load coming off the springs and compare with the total actually removed from the engine. If the two values agree, deduct the several amounts from the spring-borne loads at each point as found for the fully loaded condition, add the dead weights, and the result will show the rail loads for the empty, or partly empty, condition. If the two values do not agree, raise or lower the bottom line of the diagram as



TOTAL CAPACITIES 2000 GALLONS OF WATER 4 TONS OF COAL  
TAKE 'EMPTY' WEIGHT OF ENGINE WITH 500 GALLS OF WATER & 1 TON OF COAL

Loads removed—Water = 1,500 gal. = 6.7 tons  
= 4.7 tons at P and 2 tons at Q  
Coal = 3 tons at Q  
Total (water and coal) = 9.7 tons  
Moments about X =  $(4.7 \times 16) + [(2 + 3) \times 3]$   
= 245.2 ft. tons  
 $R_1 = 245.2 \div 33.58$  or 7.3 tons  
 $R_2 = 9.7 - 7.3 = 2.4$  tons

The spring reactions for the truck spring = 0.15 in. per ton per axle  
" " " " coupled spring = 0.12 in. " " " " bogie spring = 0.10 in. " " per bogie

The deflections, measured from left to right, are as shown on the diagram above and correspond to loads which are equal to  $(1.6 + 3.07 + 3.95 + 4.96 + 7.3)$  or a total of 20.88 tons, which is more than twice the amount required. By raising the bottom line of our diagram through a distance of 0.27 in. we obtain revised additions and deductions as follows:—

Truck	1st Coupled	2nd Coupled	3rd Coupled	Bogie
+ 0.2 ton	— 0.82 ton	— 1.7 tons	— 2.71 tons	— 4.6 tons
or a net total deduction of 9.63 tons, which compares very closely with the 9.7 tons for the water and coal removed.				
	Tons	Tons	Tons	Tons
Springborne loads (full) ... ..	9.0	14.8	14.3	14.8
Difference as above ... ..	+ 0.2	— 0.82	— 1.70	— 2.71
" Empty " sp. b. loads ... ..	9.2	13.98	12.6	12.09
Dead weights ... ..	1.7	3.2	3.7	3.2
Empty rail loads ... ..	10.9	17.18	16.3	15.29
				18.7

Fig. 7

The second case is complicated by the articulation; but while this involves rather more calculation, the principles to be applied are very similar. The engine in question is one of a batch of 2-6-2 + 2-6-2 locomotives now operating on the Great Western of Brazil Railway, and the small diagram given in Fig. 8 shows the leading dimensions of the wheelbase. In all cases a tenderer will endeavour to base his design on some previous order, and taking that as his base, make the necessary additions and deductions. By so doing, the amount of work in the design stage, as well as the risk

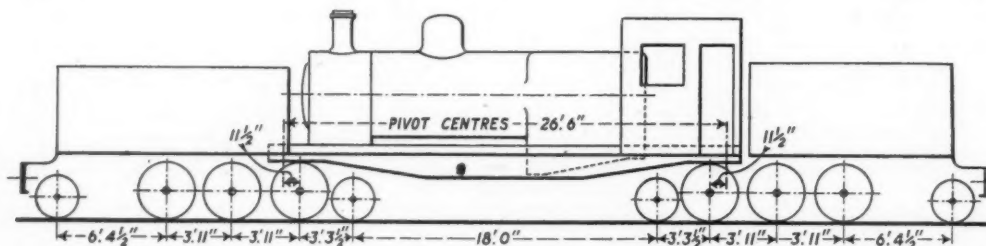


Fig. 8

shown by the chain-dotted lines on Fig. 6 until the values obtained agree with the total weight of fuel and water removed. In this connection it should be noted that the deflection at the bogie centres may be for two or four springs, and that for the truck may be for one or two springs, according to the design of each unit. In calculating the load removed at each point, however, this is definitely a feature to be watched, and for the coupled wheels the loads removed will naturally be those for two springs.

of error, is in inverse ratio to the material available in the base. The greatest work and risk is involved where no base is to hand, and a completely new design is inevitable. For present purposes this is the line to be taken for case (2).

The leading dimensions being controlled by specification, a design, drawn to a scale of 1/12 full size, is prepared to cover all features required and considered essential. The various components are placed in the positions which the designer from experience considers most suitable, and while the draw-



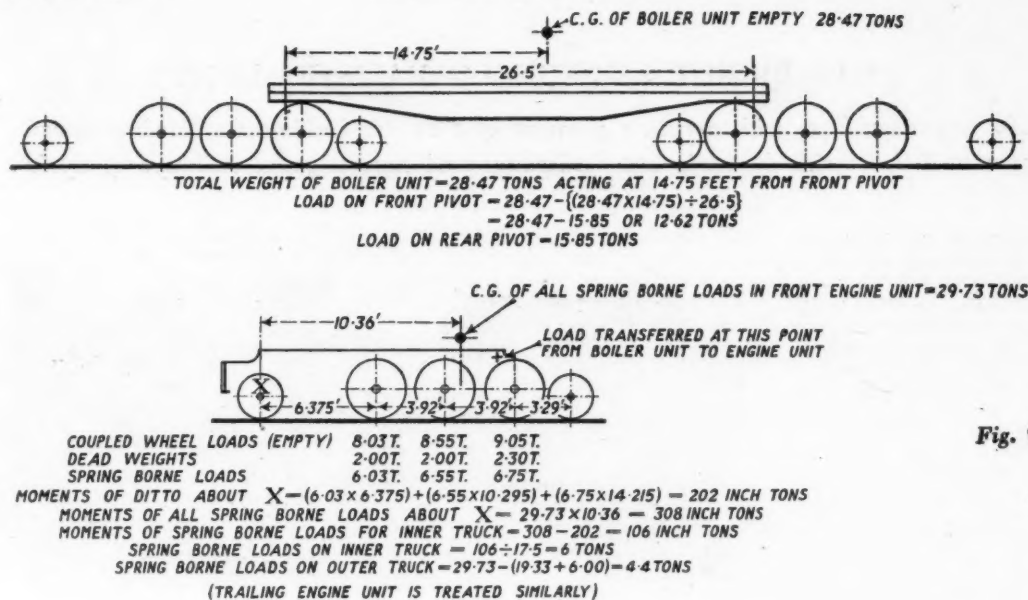
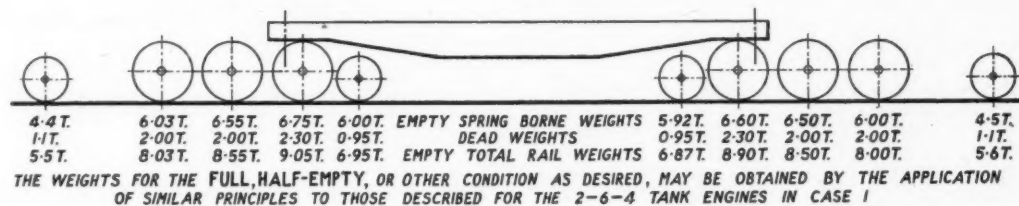


Fig. 9



ing is progressing, lists of the items involved are prepared on tabular sheets as shown by Fig. 2 above. These lists include all details, and are prepared for an empty vehicle, the fuel, water, and oil being added at a later stage. For the Garratt engine, three lists are employed, these being for the leading and trailing engine units, and the boiler unit. The variations in the two first named are chiefly in the superstructure, i.e. tanks and bunker, as the wheels and axles, running, driving, spring and brake gears, buffing, and drawgear, etc., are practically common for each unit. It is, nevertheless, a good plan to run separate lists for each unit, and the calculated weights can be added to the second list for the similar details as found for the leading engine unit.

When the detail weights and moments have been completed for each list, the c.g. of the boiler unit is determined, and the loads coming on each of the two pivots entered on the appropriate engine unit lists. The c.g. of each engine unit is then found, and the distribution of weight over the several axles apportioned as explained for case (1). Dead weights can then be added to give the loads available at the rail, any adjustment considered necessary being made at this stage. Fig. 9 explains the process in diagram form.

One further point calls for observation. Where engines are fitted with equaliser spring beams, these should be taken into account when working out the empty weights for a locomotive, the full weights of which at the rail are known. The calculations involved are too extensive for an article of this nature, but due regard must be paid to these to ensure results being obtained that will be satisfactory in service.

Fig. 10 is an interesting example of a conversion from a "base" engine, though the size is small. An urgent call came through in 1916 for a batch of 4-6-0 tank locomotives for the 60-cm. French war front lines, and the nearest base available was the 0-6-0 locomotive illustrated. By moving the first pair of coupled wheels to the rear, and substituting a four-wheel bogie, the 4-6-0 type was obtained without interference with such main features as cylinders and motion, wheels, axles, boxes and spring gear, and with patterns and templates already to hand, work in the shops was com-

menced for a considerable quantity of important details immediately the order was received.

The distribution of weight for tenders is a simple proposition, and is generally a matter of spreading it as evenly as possible over 3 or 4 axles, or two bogie centres, according to the design of the vehicle. While no difficulty need be experienced here, there is a possibility of considerable varia-

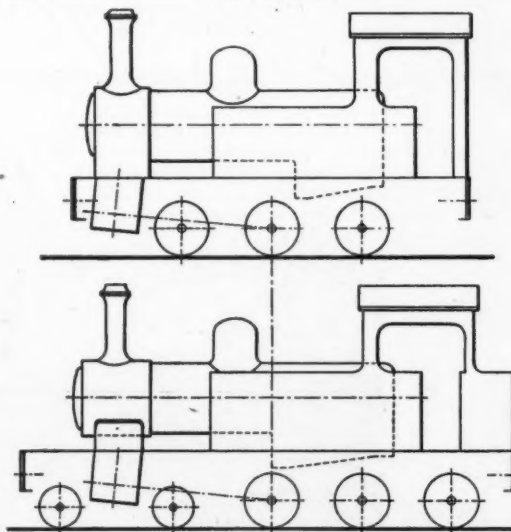


Fig. 10

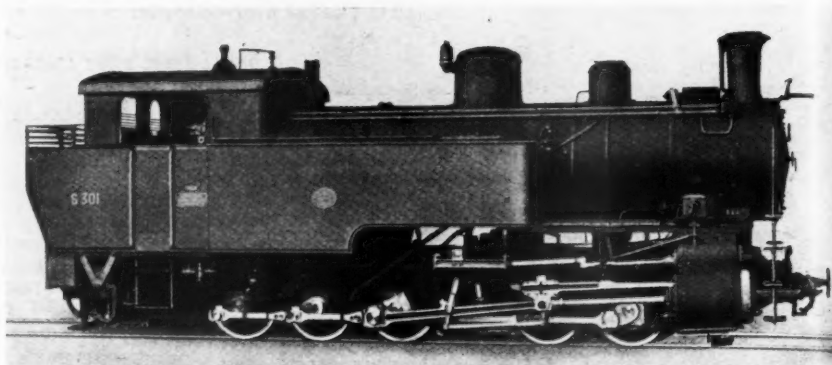
tion between the full and empty conditions, and it is a good plan to obtain an even reading at the rail with 60 per cent. of fuel and water. If this is achieved, the up and down variation due to the loaded and empty conditions will be at a minimum.

## THE BEIRUT SECTION OF RACK RAILWAY

*An important line, with a ruling gradient of 1 in 15, linking the Mediterranean port of Beirut with the main standard-gauge and narrow-gauge railways of Syria*

THE most interesting section of line on the railway system of the D.H.P. Railway (Société Française du Chemin de fer Damas-Hama et Prolongements) is the Trans-Lebanon portion from Beirut to Rayak, of 3 ft. 5½ in. gauge, with its 19·8-mile rack section on the Abt system, and special equipment. The Lebanon range is crossed at an altitude of 4,877 ft., so that almost this height has to be climbed from the west or Beirut side, where the ruling gradient is fractionally steeper than 1 in 15; on the eastern climb the ruling grade is 1 in 16½. The sharpest curve is 100 m. (328 ft.) radius. Constructional engineering works were heavy, and, in fact, they were by no means light even on the flatter-graded sections through Rayak and Damascus to the Palestine frontier by either the original and since-abandoned French line or the northern section of the Hedjaz Railway. The existing railways southward of Rayak to Damascus and on to Palestine and Transjordan are of 3 ft. 5½ in. gauge. From Rayak northwards to the Baghdad Railway at Aleppo the line is built to the standard gauge of 4 ft. 8½ in.

In 1894, just prior to the completion of the rack section the first series of locomotives was ordered for it from the Swiss Locomotive & Machine Works, Winterthur, which firm has, in fact, also supplied all subsequent rack locomotive stock. These first engines are of the 0-6-2 type in so far as the adhesion wheel arrangement is concerned. Their weight is 43 tons in working order, and they were designed to work trains of 85 tons on the 1 in 15 grades. Increasing traffic subsequently necessitated placing a further order for a second

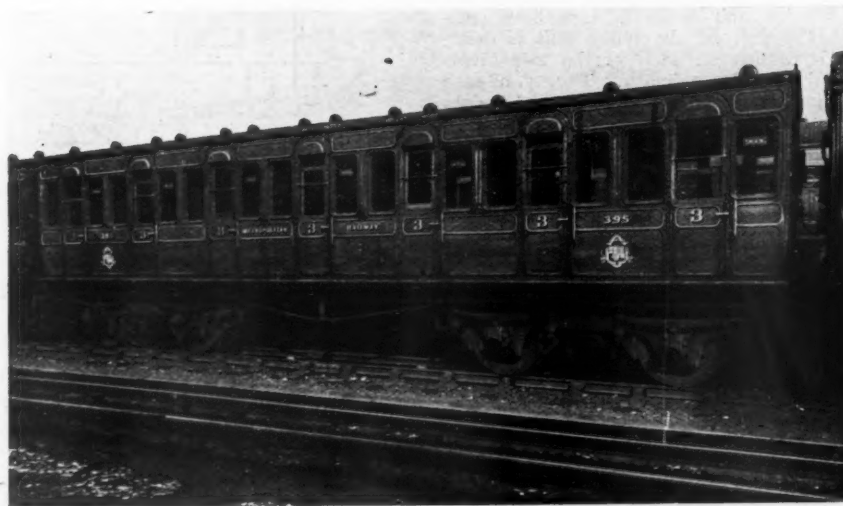


*Combined rack and adhesion locomotive of the Beirut-Rayak line, built by the Swiss Locomotive & Machine Works, Winterthur*

series of more powerful rack locomotives. These weigh 56 tons, have eight-coupled adhesion wheels and a truck, and are capable of working 110-ton trains. Unlike the first series, the second was equipped with superheaters. In 1924 the latest series was placed in service. Its engines weigh 60 tons in working order and have ten-coupled adhesion wheels, are superheated, and are capable of handling the following loads:—

Grade	1 in 15 Tons	1 in 16½ Tons	Speed m.p.h.
Passenger trains ...	100	120	9
Goods trains ...	140	160	7½

On the adhesion sections 15½ m.p.h. speeds are maintained up 1 in 40 grades. As the greater flow of traffic is from east to west, the slightly easier grades against the load in that direction tend to balance loadings.



*Metropolitan railway coach, built in 1898 for steam service, converted for electric traction some years later, and now in use once more on steam services (see editorial note page 110)*

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# ROAD TRANSPORT SECTION

## Government Road Haulage Scheme

ON December 22 it was announced that the following appointments had been made, with the approval of the Minister of War Transport, to the Hauliers' National Traffic Pool, constituted as part of the Government Road Haulage Scheme:—

General Manager & Secretary—Mr. R. W. Sewill (Director of Associated Road Operators Limited, Joint Chairman of the Road-Rail Conference, and a member of the employers' panel of the Road Haulage Wages Board). Mr. Sewill will be granted leave of absence by Associated Road Operators Limited while holding this office.

Chairmen of Local Management Committees:—

Place	Name
London (Metropolitan)	Mr. W. French (United Service Transport Co. Ltd.)
London (Southern and South Eastern)	Mr. D. Richardson (Gamman & Dicker Limited)
Cambridge	Mr. F. Bullen (Giles & Bullen Limited)
Liverpool	Mr. W. Cornes (Garlick, Burrell & Edwards Limited)
Manchester	Mr. J. A. Wilson (Lloyds Storage & Wharfrage Company)
Newcastle	Mr. A. D. Currie (Currie & Co. Ltd.)
Leeds	Mr. H. Wood (Chapple & Wood)
Sheffield	Mr. Henry Grocock (John Grocock & Co. Ltd.)
Hull	Mr. A. N. Anns (Fred Cook Transport Limited)
Birmingham	Mr. L. W. Gupwell (A. J. Gupwell Transport Limited)
Nottingham	Mr. W. J. A. Peck (P. X. Limited)
Bristol	Mr. H. W. Hawker (H. W. Hawker Limited)
Plymouth	Mr. C. S. L. Burleigh (Glover & Uglov Limited)
Cardiff	Mr. O. G. Wynn (R. Wynn & Sons Ltd.)
Swansea	Mr. A. Andrews (Andrews Transport Limited)
Glasgow	Mr. R. L. Young (Young's Express Deliveries Limited)
Edinburgh	Mr. C. B. Bennett (John Bennett Limited)
Dundee	Mr. G. W. Adamson (C. Adamson Limited)

Each local management committee is linked with an area or sub-area office of the Ministry of War Transport Road Haulage Branch and is responsible to the pool for the area or sub-area dealt with by that office.

It is the intention of the Minister of War Transport that, as a part of his road haulage scheme, an organisation of hauliers shall be set up to act, wherever practicable, as his agent for the allocation to carriers of traffics accepted by him for road movement and not conveyed on (a) vehicles hired by him under his "general conditions of hire of goods road motor vehicles" or on charter to him under those or any other conditions; (b) vehicles owned or hired by any other Government Department.

The Minister will consult with the hauliers' organisation with a view to making the best use of the whole vehicle strength available to him for the carriage of traffic accepted by him, but this is not to be understood as modifying in any way the right of the Minister to make full use of the carrying capacity of the vehicles on charter to him or owned or hired by other Government Departments where he has undertaken the responsibility of loading.

This organisation is known as the Hauliers' National Traffic Pool and will consist of a committee (the pool) composed of the members for the time being of the Road Haulage (Operations) Advisory Committee. The pool may appoint to act on its behalf and under its direction area and sub-area management committees at such places and covering such areas as may be agreed between the Minister and committees is to be subject to the approval of the Minister, and the pool. The appointment of members of the management committees is to be subject to the approval of the Minister and this may be withdrawn at any time with respect to any member after consultation with the pool. The Minister will indemnify the pool and members of the management committees against claims made against them and expenses incurred by them in relation to claims arising out of the proper discharge of their duties in connection with the road haulage scheme, provided that the Minister's sanction is

obtained before action is taken in respect of a claim. It will be the responsibility of the pool to obtain the sanction of the Minister to its expenditure, and all sanctioned expenditure will be reimbursed by the Minister.

Registration to participate in the carriage of traffic allocated by or on behalf of the pool is open to all owners of vehicles licensed to carry for hire or reward under an "A" or "B" licence or corresponding Defence Permit. The pool, with the Minister's approval, may appoint sub-agents who normally accept traffic for carriage on vehicles other than their own. All contracts covering the movements of traffics will be made directly between the Minister and the carrier whose vehicles convey the traffic. The pool is not to allocate traffic to vehicles operated under "B" or "C" licences or corresponding Defence Permits unless it has obtained an assurance from the operator concerned that he is not debarred from carrying the traffic. The allocation of traffic is to be in the sole discretion of the pool and in exercising that discretion the pool is to have regard primarily to the efficient and economic handling of traffic, and subject thereto to the fair distribution of the traffic between registered participants.

The general rules governing registered participants provide that participants will assist the pool with the provision of such of their vehicles as are suitable and available and are from time to time required for the movement of traffics allocated by the pool. The management committees will allot to a participant only such traffic as it is estimated he can carry on his own available vehicles. Where a participant is unable through events beyond his reasonable control to carry out his contract he is immediately to inform the pool office concerned and if requested shall use his best endeavours to put the pool office in touch with a carrier who is able to complete the contract.

The Minister of War Transport's conditions of contract of casual haulage (tonnage or job rates) are to apply to all traffic allocated by the pool to participants.

If the pool is dissatisfied with the manner in which a participant carries out his obligations it may terminate his participation, subject to a right of appeal to the Minister.

Sub-agents will be appointed by the pool subject to the approval of the Minister and the appointment may be revoked by the pool with the approval of the Minister at any time. The pool will entrust traffic to sub-agents for carriage in vehicles suitable and available provided by but not owned by them. The sub-agent will be responsible for securing the acceptance by the owners of the vehicles of the Minister's Conditions of Contract of Casual Haulage (Tonnage or Job Rates).

The Minister will pay to the sub-agent the gross haulage charges subject to deduction for insurance as provided in paragraphs 5 and 6 of the conditions of contract of casual haulage (tonnage or job rates); the sub-agent will receive these charges as agent for the carriers, which will be remitted by him in full to the carriers, subject only to the deduction of commission not to exceed 5 per cent. on the gross haulage charges.

### L.N.E.R. Cartage Department in Scotland

The Cartage Department of the L.N.E.R. controls almost 500 road vehicles, consisting of rigid motor lorries, mechanical horse units, and trailers. They are distributed throughout the country as follows:—

Western District	..	247	vehicles
Northern District	..	115	"
Southern District	..	108	"
Aberdeen District	..	27	"



## Silver Jubilee of the "East Kent"

*The East Kent Road Car Co. Ltd., now an associate of the Southern Railway, was formed during (and as a result of) the war of 1914-19. Its anniversary occurs during even more severe war conditions*

FOR some time prior to the outbreak of hostilities in 1914 there had been several well-established but localised undertakings in the East Kent area, with three of which Mr. Sidney Garcke was intimately concerned. By 1915, their difficulties had become very great, and it was felt that by pooling resources the business as a whole would be better able to survive the war. Further, a certain amount of overlapping of traffic was taking place. Accordingly, in April, 1916, Mr. Garcke presided over a two-day conference in Canterbury, and after difficult negotiations the terms of amalgamation under which the present company was to be formed were agreed upon, and the new company began to operate the united business on September 1 in that year. It was a struggle to keep going during the last two years of the war, but the East Kent Road Car Co. Ltd. managed to pay a 5 per cent. dividend to the shareholders. The company was incorporated on August 11, 1916, and was formed to take over the East Kent business of Thomas Tilling Limited (the Folkestone District Road Car Company); the Deal branch of the British Automobile Traction Co. Ltd. (the Deal & District Motor Services); the Margate, Canterbury & District Motor Services Limited; Ramsgate Motor Coaches (Grigg's) Limited; and the motorbus business of Wachter & Co. Ltd. of Herne Bay.

### Striking Nineteen Year Development

With the return of visitors to the area after the war, and a reorganisation designed to deal with the great variation of traffic as between summer and winter, the undertaking became prosperous, and was able to declare a dividend of 10 per cent. per annum on the ordinary shares for many years. For several years prior to 1940, when the company had to pass its dividend, it had been found possible to distribute 8 per cent. The remarkable growth of the business as between the first clear year after the last war, and the last year clear of the influence of the present war, that is to say, over a period of 19 years, is shown strikingly by a number of comparative figures. The cars owned at the beginning were only 74; while, just before this war, the figure was 549. The annual revenue was just over £130,000; at the end of the 19 years it was nearly £700,000. At the end of the last war the company paid annually in taxation what would now be regarded as a negligible sum, but in 1938 it was £108,000, and today, of course, it is very much greater. At the beginning of the 19-year period the company carried a little over four million passengers annually and was very proud of the achievement; in 1938 the company handled its record traffic of over 46 million persons—more than 10 times as many. During the period the organisation possible only to a relatively larger unit, though not one so large as to be unwieldy, gradually resulted in the smaller operators finding that they could not keep pace, and, in the early days, several of the more important came in, taking shares in the East Kent Road Car Company for their businesses.

More recently the tramway & bus services of the Isle of Thanet Electric Supply Co. Ltd. (from March 25, 1937), as well as the tramway services of the Dover Corporation (from January 1, 1937), were by agreements replaced by East Kent bus services and today the company is in an almost unique position among bus undertakings in that not only does it provide the interurban services throughout its considerable and well-defined area, covering the whole coast from the Thames mouth round to Hastings, but also the internal services for all the towns large enough to require them—11 in number. At the outbreak of the present war, the East Kent fleet comprised 549 vehicles.

### East Kent Fleet and the National Effort

The twenty-fifth ordinary general meeting of the company was held at Canterbury on December 16 last, with Mr. Sidney

Garcke, C.B.E. (Chairman of the company) presiding. As we have remarked on more than one occasion in the past, Mr. Garcke usually takes the opportunity presented by this company's annual meeting to make interesting statements concerning the English bus industry. This time he naturally devoted his remarks to the East Kent silver jubilee, but many of them are of wider interest. He said: "This meeting marks the conclusion of the twenty-fifth year in the story of the company. It would be a very melancholy jubilee celebration were I obliged again this year to present to you an unfavourable report and no dividend. The remarkable change for the better has been unexpected, sudden, and complete. There has been an increase in the revenues of no less than 28 per cent. It might not be in the public interest for me to tell you in detail how this has arisen, but you will be glad to learn that your vehicles have been busily employed, either locally on the maintenance of essential public services or elsewhere working in the interest of the national effort. Apart from arrangements which we have made to use much of the transport facilities at our disposal to better advantage elsewhere, we have during the last few months of the financial year experienced a substantial improvement in the revenues derived from our ordinary services. The spending power of the public seems to have increased considerably, and the travel on our cars has now grown to an extent that is producing uncomfortable conditions, but I feel sure that our passengers, mindful of the excellent services which we have been able to provide for so many years, will appreciate that we are still doing the best for them that is possible in present circumstances."

### Seasonal Variation Avoided

"A factor which has contributed to our recovery is that, while in years of peace this bus system, more than any I know, suffered from an absence of traffic during the long winter season, it is now under the altered conditions obtaining a more even flow of revenue throughout the year. Little imagination will enable you to appreciate how difficult it is to organise a road passenger transport business which has the greater part of its fleet of cars lying idle for something like two-thirds of the year. Such a condition must have associated with it high average working cost for each mile run and general inefficiency. These disadvantages have been rectified for the time being, and the satisfactory results we are able to lay before you today are a reflection of a more even spreading of our work."

"Taken on the whole, our assets—buildings, rolling stock, plant, as well as investments—have been well preserved in value. Up to now we have been successful in maintaining our rolling stock in such a state as will enable us on a return to peace conditions readily to pick up our normal business of catering for the residents and visitors in this area. We are, of course, unable to renew a proportion of the cars year by year as is our custom, and in consequence we have gathered a large amount in liquid assets, and we have built up a big depreciation and renewals fund, but I have no doubt that the whole of these accumulations will be required for the purchase of new vehicles as soon as that again becomes possible."

### Unusual E.P.T. Position

"Our position in regard to Excess Profits Tax is peculiar and calls for some explanation. As many shareholders will be aware, the tax operates in this way: that a standard profit is taken based upon pre-war years, and anything that a company may make by way of profits in excess of that standard is paid to the State. Now our pre-war standard is not a bad one, but nevertheless the profits derived from the past year are such that our Excess Profits Tax would have been much heavier

had it not been that for some time prior to the year under review the profits were so far below our standard that we had a large deficiency to carry forward into the accounts now before you. Thus our liability to E.P.T. this time is comparatively small, but for the year we have now entered, unless there is a marked change in the general situation, our taxation will be much heavier, since we shall not have the set-off of a deficiency brought forward. The Directors have taken this fact into consideration when recommending a distribution.

Were a dividend to be declared on the past year fully commensurate with the profit balance available, we might be obliged to disappoint you by not maintaining such a rate in the current year. In all the circumstances the Directors have thought it right to return to the rate of dividend which applied in the year before last and for several years before that.

The dividend declared in respect of the year ended September 30, 1941, was 8 per cent. The report was summarised at page 679 of our issue dated December 19 & 26, 1941.

## The Nizam's State Railway Road Services

**H**E.H. the Nizam's State Railway, pioneer road transport owning and working administration in India, still continues to show markedly improved earnings and development generally in its road service activities. This fact and the remarkable strides that have been made since the inception of these road services in June, 1932, is best illustrated by the following table :—

Year ended March 31	No. of vehicles	Route- miles	Coaching earnings	Goods earnings	Miscel- laneous earnings	Total gross earnings
			Rs. lakhs	Rs. lakhs	Rs. lakhs	Rs. lakhs
1933	33	284	2.78	—	0.06	2.84
1934	62	595	5.66	—	0.10	5.76
1935	102	1,232	9.50	0.15	0.16	9.82
1936	137	1,354	12.98	0.20	0.16	13.34
1937	318	3,977	22.40	0.34	0.23	22.96
1938	358	4,017	28.34	0.77	0.32	29.44
1939	368	4,069	27.47	0.99	0.20	28.66
1940	347	4,082	27.80	1.54	0.21	29.55
1941	341	4,186	32.92	1.71	0.30	34.93

N.B.—Coaching earnings include parcels by bus and goods earnings parcels by lorry

The decrease in vehicles during 1940-41 was due to the scrapping of old petrol vehicles. On March 31, 1941, there were only 80 petrol-engined vehicles left as against 261 with diesel engines. Seven new vehicles were acquired in 1940-41, one Leyland Lynx lorry, five Ford vanettes, and one Ford utility car. The body for the Lynx was built in the road transport workshops of the railway. The Rs. 5.38-lakhs increase in gross earnings during the year ended March 31, 1941, was due mainly to heavier passenger traffic, which, being carried in a slightly smaller bus fleet, produced a very high

occupation ratio, inconceivable in normal times. The existing fleet has, in fact, reached saturation point, and there are definite indications of a large latent passenger traffic which is lost at present due to the limited capacity of this fleet. Future prospects, once more vehicles can be acquired, are, therefore, very bright. Road and rail connections continue to receive constant attention, as do punctuality and improved standards of driving and maintenance.

Out-agency collection and delivery services on behalf of the railway accounted for Rs. 1.55 lakhs or 91 per cent. of the total goods earnings in 1940-41, and the average goods load obtained was 3.53 tons a loaded vehicle, as compared with only 3.00 tons in 1939-40; the average load per vehicle-mile (loaded and empty) was 2.31 tons as against 1.90 tons in the previous year.

Operating and maintenance costs have risen by 1.4 pies a vehicle-mile during the past year, but the increased cost of tyres, replacements and renewals alone rose by 2.1 pies and fuel and lubricants by 1.5 pies, whereas costs of administration, labour, and other items fell due to the general economy campaign. There has also been an improvement in the mileage obtained from diesel oil, 19.7 miles per gallon being attained as compared with 18.4 miles in 1939-40. Considerable economies have been effected by the local manufacture of spare parts in the road transport workshops.

The average number of buses under repair in the workshops and depots decreased from 12.6 to 11.9 per cent. during the year 1940-41, but the average number of lorries increased from 14.3 to 18.2 per cent. In all 149 vehicles out of the 341 were repaired, the average time taken for each repair being 34 days, and the average costs were Rs. 1,605 for a bus, Rs. 293 for a lorry, and Rs. 325 for a departmental vehicle.

## South African Road Transport

**T**HE tenth annual report of the Central Road Transportation Board constituted under the Motor Carrier Transportation Act of South Africa, 1930, covers the period April, 1940, to March, 1941. The control of the board is exercised from headquarters in Pretoria, but there are in addition ten local boards which function in the transport areas fixed by the Act. The appeals to the Central Board against decisions of the local boards during the year numbered 99, of which 29 were upheld, 16 partly upheld, 45 dismissed, 6 withdrawn, and 3 remained to be heard. For the year 1940, 8,418 motor carrier certificates were issued, as well as a number of temporary certificates and exemptions. According to the traffic returns submitted by carriers, 119,149,731 passengers and 4,184,999 tons of goods were transported in the year 1940. The corresponding figures for 1939 were 113,049,439 passengers and 4,327,679 tons of goods. The revenue of the board amounted to £32,507, and its expenditure to £30,384. The amendments proposed by the board in its previous annual report were adopted in principle, and the corresponding legislation brought about certain important changes. Additional recommendations are made in the present report. An important proviso contained in the Amendment Act provides for a revised system of deposits to deter applicants from applying repeatedly or maliciously for competitive concessions, to the prejudice of holders, who are put to the expense of appearing. Under

the new clause such deposits may be retained at the discretion of the Board, or used wholly or in part to indemnify any person to whom the unsuccessful application or objection occasioned any expense.

### WEIGHTS OF PASSENGER LOADS

The following table is based on the assumption that the average weight of a passenger will not exceed 10 stone :—

Number of passengers		Weight		Number of passengers		Weight		Number of passengers		Weight	
	tons	cwt.									
8	...	0	10	33	...	2	11	57	...	3	11
9	...	0	11	34	...	2	12	58	...	3	12
10	...	0	12	35	...	2	13	59	...	3	13
11	...	0	13	36	...	2	14	60	...	3	14
12	...	0	14	37	...	2	15	61	...	3	15
13	...	0	15	38	...	2	16	62	...	3	16
14	...	0	16	39	...	2	17	63	...	3	17
15	...	0	17	40	...	2	18	64	...	4	0
16	...	0	18	41	...	2	19	65	...	4	1
17	...	0	19	42	...	2	20	66	...	4	2
18	...	0	20	43	...	2	21	67	...	4	3
19	...	0	21	44	...	2	22	68	...	4	4
20	...	0	22	45	...	2	23	69	...	4	5
21	...	0	23	46	...	2	24	70	...	4	6
22	...	0	24	47	...	2	25	71	...	4	7
23	...	0	25	48	...	3	0	72	...	4	8
24	...	0	26	49	...	3	1	73	...	4	9
25	...	0	27	50	...	3	2	74	...	4	10
26	...	0	28	51	...	3	3	75	...	4	11
27	...	0	29	52	...	3	4	76	...	4	12
28	...	0	30	53	...	3	5	77	...	4	13
29	...	0	31	54	...	3	6	78	...	4	14
30	...	0	32	55	...	3	7	79	...	4	15
31	...	0	33	56	...	3	8	80	...	4	16
32	...	0	34	...	...	...	...	...	...	...	...

## A Four-Storey Underground Car Park

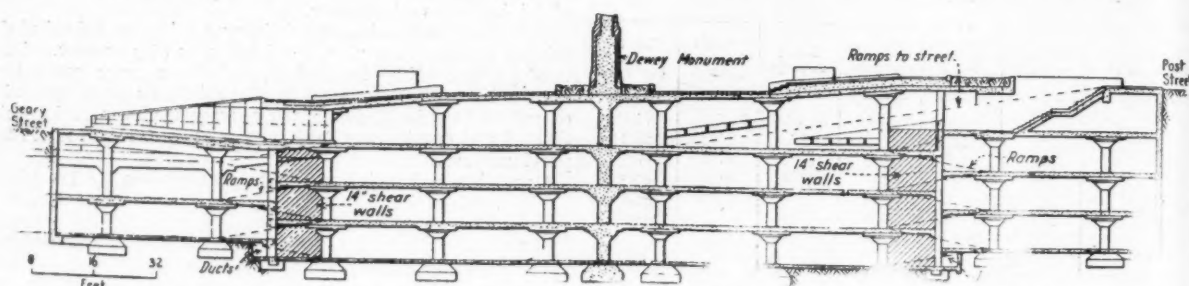
*To provide parking space for 1,700 cars, Union Square in San Francisco has been excavated to a depth of 48 ft.*

A SERIOUS parking problem in the downtown shopping centre of San Francisco has now been solved by the construction of a four-storey underground car park beneath Union Square. Interested merchants formed a non-profit concern known as the Union Square Garage Corporation to finance the scheme. The square, which measures 275 ft. x 412 ft., has been excavated to a depth of 48 ft. to enable the four tiers of steel and concrete park to be built to accommodate 1,700 motorcars.

The sides of the excavation were temporarily supported by steel piling, struttled with inclined timbers 12 in. x 12 in.

the park is inclined. This fact and the advisability of short ramps and easy curves dictated the arrangement of half-floors at the two sides of the park shown in the accompanying illustration. This arrangement economises space with the 9 ft. 6 in. difference in floor levels. But to transmit the side-to-side thrust through the floors it was necessary to provide for the thrust to pass from the half or mezzanine floor levels to the main floor levels and back again, and this was achieved by designing the ramp to take this thrust.

The Dewey Monument which stood in the centre of the



*Cross-section to show relation of mezzanine floor to main floors, ramps, and shear walls*

in section from the concrete footing of the second row of columns from the piling. These struts are in pairs in a common vertical plane, but at two different inclinations, and are tied together with 12 in. x 3 in. double diagonal bracings. The pairs are spaced from 8 ft. to 9 ft. apart, the spacing of the piles, which vary from 10-in. 53-lb. H sections to 21-in. 59-lb. W.F. beams. The concrete walls of the park were later built inside the pile-and-timber breastwork, and were designed to take thrust from all four sides inwards. The floors are horizontal diaphragms transmitting the thrust from side to side. They are of flat slab construction, in bays 24 ft. 3 in. x 27 ft. 5 in. between rows of supporting columns. The bases of the walls are struttled to the footings of the first row of columns by 18-in. x 18-in. concrete horizontal struts beneath the lowest floor, and spaced at the same centres as the columns. When the concreting was completed the steel piles, timber breastwork, and struts were removed.

Geary Street on one side, and Port Street on the other side of the square are at different levels, so that the roof of

square is to be replaced on the roof of the park, but it has been rebuilt to resist earthquake shock, and its new r.c. core will be bonded into the structure of the park, which is specially designed to support the monument with a column carried down to the foundations. This column is 3 ft. in diameter, whereas the other ordinary columns supporting the floors vary from 22 in. on the top storey to 30 in. on the bottom floor. The whole structure is designed to withstand earthquake shocks and also incendiary bombs and fragmentation caused by and splinters of high explosive bombs during air raids. It might, therefore, be used as a raid shelter—a likely possibility in the new phase of the war—but is, of course, no protection against a direct hit.

The roof surface will be overlaid with a minimum of 2 ft. of soil for landscape gardening and special boxes are provided to give 5 ft. of soil for trees; the roof slab is 12 in. thick. Mr. T. L. Pflueger is the architect and Messrs. W. L. Huber and E. M. Knapik are the structural engineers for the project, according to the *Engineering News-Record*, from which also the illustration is reproduced.

## Spanish Road Construction

The programme of public works recently announced by the Minister of Public Works in Madrid includes the regrading and improvement of existing roads, as well as the construction of new ones. With the addition of the proposed new roads the plan provides for 20,000 km. of main highways, 24,000 km. of secondary roads, and 69,000 km. of local roads; in all, 113,000 km., or 70,000 miles. Minimum widths are fixed at 9 m. (29½ ft.), 7½ km. (24½ ft.), and 6 m. (19½ ft.), for the three classes of roads. The total estimated cost of improvements and new construction is 1,421,000,000 pesetas (about £35,500,000). Taxation dues from licences, from the petrol and transport taxes, etc., produce 360,000,000 pesetas annually, and, as the present budget vote for roads

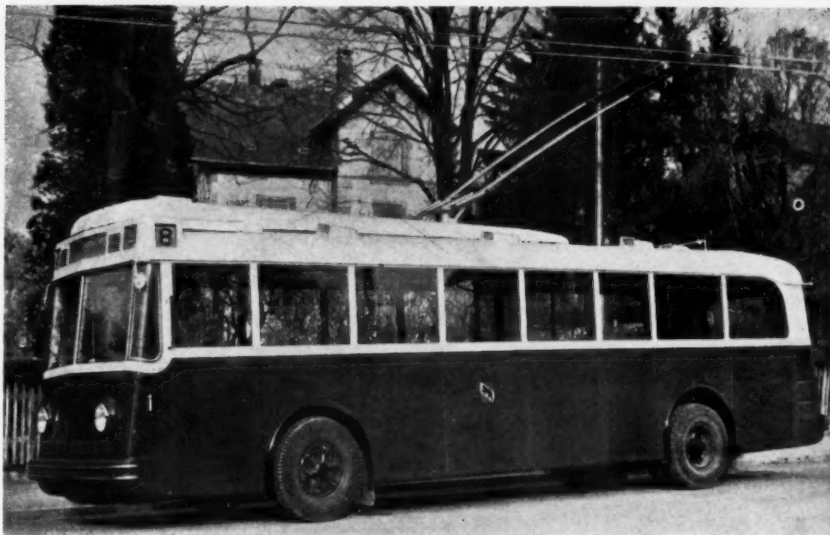
is 159,803,000 pesetas, there is a balance of over 200,000,000 pesetas available for carrying out the plan independently of any additional financial credit. The Minister has declared himself in favour of a concrete surface, but this is ruled out by considerations of cost, except on special lengths of trunk roads, and asphalt is being used. Even this material is not easily obtained in sufficient quantity; of the total of 75,000 tons required annually, only 15,000 tons is produced in Spain.

The elimination of level crossings is an essential part of the general plan, and it is hoped that most of the crossings on the principal main roads will have been replaced by the end of 1942.



## Trolleybus Services in Switzerland

ALTHOUGH a pioneer route had been opened in 1912 between Fribourg and Posieux (later extended to Favargny, and closed in 1933), it is only during the last three years that modern trolleybus services have been introduced in Swiss cities, apart from the Lausanne-Ouchy line of 1932. The accompanying table gives particulars of all routes in Switzerland. It will be observed that Lausanne has by far the most extensive system; several tram routes were replaced here by trolleybuses in view of the steep gradients and narrow streets. A second route in Zurich is at present being equipped, and lines in Lucerne, St. Gall, and Geneva are proposed. The most recent lines replace buses, and their completion was expedited in order to reduce fuel consumption and maintain adequate services. An interesting feature of the line in Basle is that two diesel-electric vehicles,



*A typical Swiss trolleybus, one of 10 operated by the Berne Tramways*

ordered before a trolleybus line was contemplated, have been equipped to take current from the overhead line, or from their own generating set, as required.

### A High-Tension Overland Route

Undoubtedly the most unusual installation is that of the Rheintalische Strassenbahnen (Rhine Valley Tramways) from Altstätten to Heerbrugg and Berneck, replacing an overland tramway and claimed to be the first trolleybus line in the world to use a tension of 1,000 volts d.c. Provision is even made for an increase to 1,500 volts if the connecting rack and adhesion railway from Altstätten to Gais is later replaced by a trolleybus service with this tension. Other points of interest are the higher speed on this line, 60 km.p.h., as against

45 on most other services, and the equipment of the buses for taking current from a generating unit fitted on a trailer, should this prove desirable in order to work them through to points off the normal route. For the present, tramway services from Altstätten station to the town and from Berneck to Diepoldsau are being continued, the tracks and rolling-stock being still in good condition. Tramcars are conveyed to the depot at Altstätten, when repairs or overhaul are required, on six-wheel road trailers hauled by a trolleybus.

Route	Length km.	Date opened	Tension d.c.	Number of vehicles	Electrical equip- ment	Re- places
Fribourg-Favargny ...	15	4. 1.12	600 v.	3	—	(new)
Lausanne-Ouchy ...	1.8	1.11.32	650 v.	3	BBC	(new)
Lausanne : 6 further routes	17.6	1938/39	650 v.	32	BBC	tram
Winterthur : Station - Wül- lingen	3.1	28.12.38	600 v.	4	BBC	tram
Zurich : Bucheggplatz- Bezirksgebäude	3.1	7. 6.39	600 v.	6	Oerlikon	bus
Neuchâtel : Pl. Purry-Ser- rières	2	16. 2.40	600 v.	3	BBC	tram
Altstätten - Heerbrugg - Ber- neck	10.4	24. 9.40	1,000 v.	5	Sécheron	tram
Bienne : Station-Metz	3.4	19.10.40	550 v.	6	BBC	tram
Berne : Station-Schosshalde	2.7	Oct. 40/ Jan. 41	600 v.	8	BBC/ Oerl.	bus
Berne : Insell-Bümpliz	3.8	5. 7.41	600 v.	2	BBC	bus
Winterthur : Station-Seeh	4.2	24. 7.41	600 v.	4	BBC	tram
Basle : Claraplatz-Hornli	3.8	31. 7.41	600 v.	3	BBC	bus
Zurich : Albisriederpl.- Spyriplatz	4.8	(under construction)		6	BBC/ Oerl.	bus
Zurich : Klusplatz-Witikon	3	(under construction)		3	—	bus
Lucerne : Allmend-Halde	4	(under construction)		6	—	bus



*Left: One of 35 trolleybuses working in Lausanne*

## New Buses for Eastern Massachusetts

*Some brief details of a system serving 20 cities and 51 towns, and carrying more than 100,000,000 passengers per annum*

**T**HE Eastern Massachusetts Street Railway Company recently placed in service 10 White model 798 motor-coaches, one of the most recent types of U.S.A. vehicle for road passenger traffic. During the past year the company has also introduced 25 White model 788 buses, an earlier product of the White Motor Company of Cleveland, Ohio. All the new vehicles have complete metal bodies, principally of aluminium alloy and high tensile steel. They have specially slanted windshields to minimise any glare in the driver's face. The power units are White 12-cylinder opposed under-floor engines developing 210 h.p. The model 788 has a wheel-base of 17 ft. 10 in. and is 33 ft. in overall length. It provides for a seating capacity of 38 passengers, with plenty of standing room for rush hour crowds. The new model 798 is a larger unit with a seating capacity of 45. It has a wheelbase of 19 ft. 10 in. and an overall length of 35 ft.

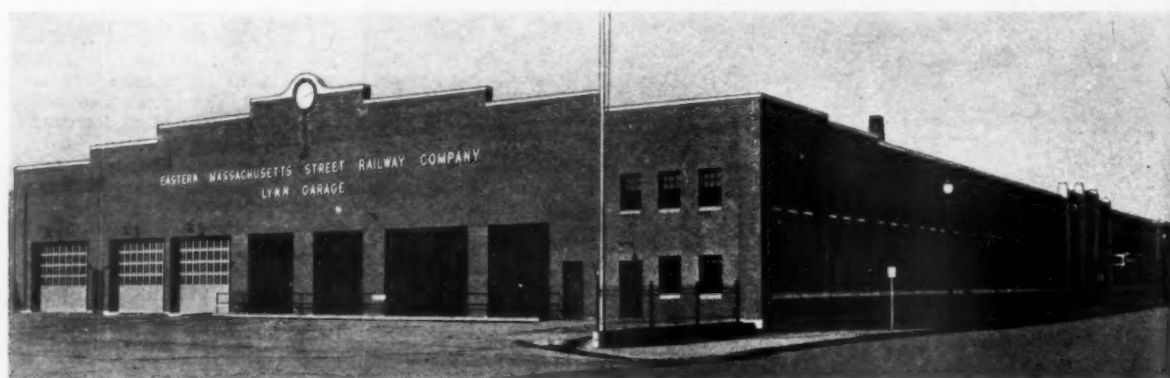
The Eastern Massachusetts Street Railway is widely known as one of the most progressive road transport organisations in the U.S.A., and one that has devoted a considerable amount of attention to the promotion of safety. The company operates in 20 cities and 51 towns, running from Newburyport, Mass., to Fall River, Mass., with main offices at the hub of the network, in Boston. Some 15 to 20 years ago this organisation, like other large tramway undertakings, was faced with heavy traffic losses as a result of the increased use of the private motorcar. In order to meet the situation, the company modernised its entire system, replacing obsolete tramcars with motorbuses, and developing better service while cutting down the costs. Today, E.M.S.R. buses are attractive, and it has modern garages at Brockton, Lawrence, Lowell, Fall River, Melrose, Salem, Lynn, Norwood, and other points. Fine terminal buildings are also well distributed throughout the operating territory. The main office and terminal at Boston is known as the Haymarket Square Terminal Building.



*One of a recent order of 38-seat White buses, with 12-cylinder under-floor engine in the service of the Eastern Massachusetts Street Railway Company*

E.M.S.R. rolling stock receives consistent care. At the end of every day's run all buses are driven on to the inspection pits and given a thorough examination, with attendant service by trained mechanics. A card system is maintained for point by point checking. All safety factors, such as brakes, lights, and windshield wipers, are rigidly tested, and the buses are cleaned inside and out on a daily schedule. While the garages themselves are well equipped for running repairs with the latest machinery, tools, and handling devices, the company also maintains control overhaul shops at Brockton, Mass., where over 100 mechanics and craftsmen are employed. Facilities not only cover ordinary operations, but such things as dynamometer engine testing, and analysis and testing of oil. An extensive stores department is maintained, and a special card system covers the control and flow of parts to the shop and to the company's 11 outside garages.

The undertaking carries more than 100,000,000 passengers every year, and we are informed that a majority of the riders depends entirely on the services for travelling to and from work.



*The Lynn garage of the Eastern Massachusetts Street Railway Company*



Completed track with long welded rails fixed to sole plates by M & L type spring clip fastenings. Note the ample ballast  
(See article pages 120 and 121)



## RAILWAY COMMUNICATION IN SOUTH-EAST BURMA

### *A brief description of the line from Rangoon to Moulmein and Ye*

**M**ILITARY operations in Malaya, Thailand, and now also in the vicinity of Tavoy, towards the southern tip of Burma on the Malay Peninsula, tend to focus attention upon the southern branch of the Burma Railways terminating at the small port of Ye, within about 20 miles of the Thailand frontier. This branch takes off the Rangoon-Mandalay double-track metre-gauge main line at Pegu (47), and, after crossing the Sittang river turns from east southwards through Kyaikto and Thaton to Martaban (170), on the northern shore of the Salween estuary opposite the important town and port of Moulmein; figures in brackets are mileages from Rangoon. A steamer ferry service is established between Martaban and Moulmein for goods and passengers. From Moulmein the railway continues southwards down the coast of the Gulf of Martaban, a further 89 miles to Ye, distant 267 miles from Rangoon.

In peacetime through passenger and goods trains are worked from Rangoon to Martaban, the line, though single, being equipped and maintained at a first class branch line standard, and all crossing stations are interlocked; in fact, this might almost be considered as a secondary main line. Beyond Moulmein, however, the standard is much lower, as are the speeds of trains. Many of the smaller bridges are of the timber pile and trestle type, and there is no interlocking.

From Moulmein to Mudon there is a brisk local traffic, but thereafter traffic is light, especially beyond Karokpi.

The country south of Moulmein is intersected by innumerable tidal creeks and a considerable number of large bridges had to be constructed to carry the line to Ye. It runs through magnificent forests of teak and other valuable timbers. Between the railway and the coast are mangrove swamps, and a good many rubber plantations have come into being along this branch of late years. The climate is very humid, and there is a tremendous rainfall—mostly between April and October—as many as 367 in. having been recorded in twelve months on one of these rubber estates. Though British India coastal steamers call regularly at Ye, they lie off the Ye river bar, and all traffic to and from them is carried by country boat, but this is often impossible during the monsoon.

An extension beyond Ye has been contemplated for many years, and a line has been surveyed right down the coast from Ye to Tavoy and Mergui and thence inland to the Thailand frontier to link up with the State Railways of that country at Prachuab Kirikan, on the east coast of the peninsula, and on the main line from the Malay States to Bangkok. The length of this extension would be about 300 miles, all but the last 20 in British territory. Preliminary arrangements



Burma Railways bridge over the Sittang River, Pegu-Moulmein section

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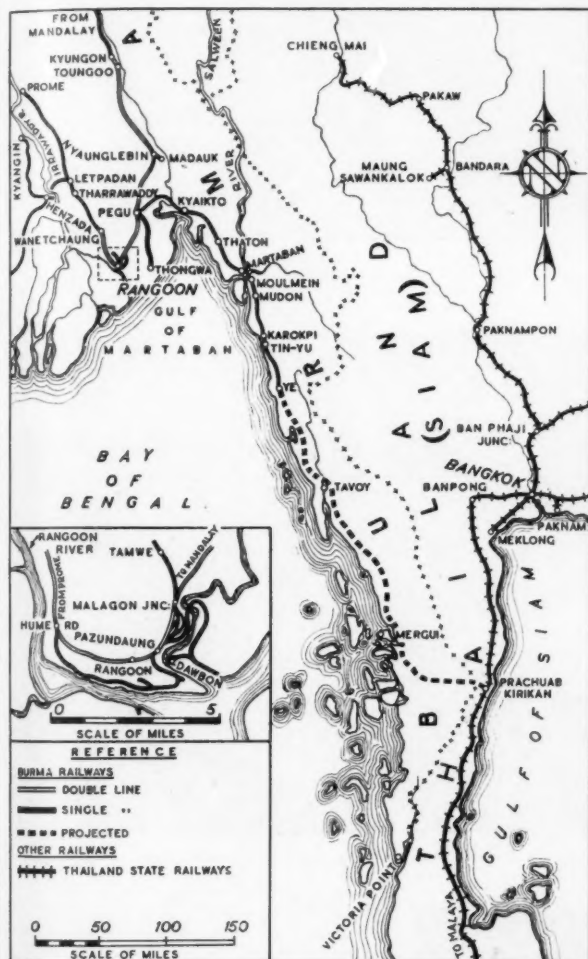


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have been made to enable a wagon ferry to be established between Martaban and Moulmein in the event of this extension being constructed. The standard of the line between Moulmein and Ye would, undoubtedly, be raised considerably also; there would be little need for improvement on the Pegu-Martaban section, which is already suitable for heavy traffic.

Referring to the map reproduced, it will be seen that the State Railways of Thailand run parallel to the existing Kyaukse-Martaban-Moulmein-Ye section of the Burma Railways—and roughly 150-200 miles east of it—and also abreast of the proposed extension south of Ye until they converge upon Prachuab Kirikan. Another point of interest is that



Sketch map of the railway communications in the frontier region of south-east Burma

Bangkok, capital of Thailand, is almost exactly 150 miles only, as the crow flies, from Tavoy. Moreover, Tavoy itself is within 40 miles of the Thailand frontier and has just been reported, together with its airfield, to have been captured by the Japanese; also it is only about 80 miles south of the Burma railhead at Ye. Maung Sawankalok, on a branch off the main Thailand line to Chiangmai, is about 150 miles from Moulmein. Ye is, however, the nearest station on the Burma Railways to the Thailand frontier, and is again some 150 miles from Paknampon, the nearest station on the Thailand system. Toungoo, an important town and station on the main line from Rangoon to Mandalay is 170 miles west of Chiangmai, the northern railhead of the Thailand railways, but there is much difficult mountainous country between these places.

## IRAQ LOCOMOTIVE AND ROLLING STOCK POSITION

IN the section of the Iraqi State Railways report for the year ended March 31, 1940, devoted to the activities of the mechanical department, it is stated that in order to enable the new rolling stock, ordered for the standard-gauge extension connecting the systems of Iraq, Syria, and Turkey, to travel from Basra, eight diamond-frame metre-gauge bogies were adapted by means of special side friction plates and centre bogie pivot castings so that they could be substituted for the standard-gauge bogies. Two metre-gauge wagons were fitted with standard-gauge buffing and drawgear at one end for the purpose of hauling the standard-gauge vehicles over the metre-gauge system.

Under the heading "Conversion of Locomotives" it is reported that the fitting of a condenser to a metre gauge 4-6-0 superheated tender locomotive No. 127 (referred to in the annual report for 1938-39), was completed during the early part of the year 1939-40, and, after trial, was placed in service. There were the usual troubles at first, which were to be expected, due to failure of parts and inexperience of the engine crews, but the locomotive is now in constant service and is giving satisfaction. It is running between Baghdad—Samawa—Baghdad, a distance of 557 km. (346 miles), which is accomplished without taking water and thus attains the object aimed at of avoiding the use of the unsuitable boiler feed-water at Samawa. Fuel consumption in normal service compared with a similar but non-condensing locomotive shows a saving of just over 2 per cent. It is too early yet to form an opinion as to whether the acquisition of additional condensing locomotives would be justified.

Referring to the subject of engine failures and the average train kilometres per engine failure, the report says that when it is realised that of the 16 failures in the year under review four were attributable to the engine fitted experimentally with condensing equipment, and the engine kilometres were approximately 3 per cent. greater than in the previous year, the number of failures must be regarded as very satisfactory.

The output of repaired coaching stock from Shalchirah workshops was higher during the year 1939-40 than for the previous year both in respect of standard-gauge and metre-gauge vehicles, but lower in respect of repaired goods stock. Standard-gauge bogie and four-wheel goods vehicles received from England during the period under review numbered 106. With the exception of eighteen of the low-sided wagons, which are through piped only, all the remaining vehicles are fitted with automatic and non-automatic Westinghouse air brakes of the latest international type, and have brakemen's cabooses. To facilitate attaching goods stock to passenger trains, 25 of the 66 four-wheel covered goods wagons were fitted with through steam heating pipes and the whole of the goods vehicles were equipped for the transport of horses and cattle. The sheep vans are designed to accommodate about 300 sheep on the two decks.

During the year, 45 vacuum-fitted bogie covered goods wagons, ordered in May, 1938, were received; 26 were erected and put into service. Thirty bogie tank wagon underframes and the necessary fittings were received from England; the tanks were built in the railway workshops, of welded construction, and put into traffic. This increase of 30 in the tank wagon stock was to meet the increased demand by the oil companies.

### New Iron and Steel Scrap Campaign

Lord Reith, Minister of Works & Buildings, announced on January 12 that a new national endeavour was to be made to collect as much iron and steel scrap as possible for the production of munitions of war, and that it was hoped to raise the weekly figure of collection to 4,000 tons. Factory managements are asked to co-operate in the new effort, and all local dumps are to be cleared. The limited supply of labour for transport will be a determining factor in the rate of collection, and although the Ministry of Supply will provide a certain amount of transport it is possible that the Army may be asked to assist.

## Railways and the War—99



*Above: Hospital unit car No. 2 of the United States Army. As we recorded at page 455 of our issue of October 31 last, the U.S.A. War Department had then recently authorised the use as hospital ward cars with Army hospital trains, of four converted Pullman cars*



*Right: Fully-equipped operating room in U.S.A. Army hospital train*



*Left: The kitchen in a U.S.A. Army hospital train*

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## RAILWAY NEWS SECTION

### PERSONAL

Mr. H. G. Oliver has been appointed secretary of United Railways of the Havana & Regla Warehouses Limited and secretary and treasurer of Havana Terminal Railroad Company in place of Mr. W. J. Maslen, who has retired.

Mr. G. H. Nelson, District Locomotive Superintendent, Accrington, L.M.S.R., who, as recorded in our November 21 issue, has been appointed to a similar position at Carlisle, was educated at Shrewsbury. He served his apprenticeship with the L.N.W.R. at Crewe and gained experience in the



**Mr. G. H. Nelson**

Appointed District Locomotive Superintendent, Carlisle, L.M.S.R.

Drawing Office of Crewe North Shed, and in the Road Motor, Marine, & Outdoor Machinery Departments. Mr. Nelson's first appointment was in 1911 at Bangor, and he was in charge of various motive power depots. Prior to the last war, Mr. Nelson, who had passed through most ranks in the Royal Artillery, was commissioned in the Special Reserve and joined the 4th Division in France in 1914. He was wounded several times, and was mentioned in despatches. He was seconded to the Royal Engineers in 1917 for Transportation Services (Light Railways), and subsequently obtained his majority as S.I.R., First Army. After the war, Mr. Nelson was posted to the B.M.M. (Railways Section), South Russia, and later went to Turkey, Persia, Palestine, and Egypt. He was demobilised in 1921, and returned to railway service at Huddersfield. After service at Patricroft, Carlisle Western, and Bletchley, Mr. Nelson was appointed District Locomotive Superintendent at Accrington in 1934.

Mr. P. D. Troskie, Chief Traffic Manager, South African Railways & Harbours, has, as recorded in our December 12 issue, been appointed Assistant General Manager (Commercial). We published a short biographical note on Mr. Troskie's career in our June 27 issue at page 709.

Mr. Frank Pick, formerly Vice-Chairman of the London Passenger Transport Board, who died on November 7, left £36,433.

#### SOUTHERN RAILWAY STAFF CHANGES

The Southern Railway Company announces the following appointments taking effect from January 19, 1942:—

Mr. C. F. de Pury, Southern Divisional Superintendent, Southampton Central, to be London West Divisional Superintendent, Woking, *vice* Mr. J. E. Sharpe, deceased.

Mr. W. H. F. Mepsted, Assistant London East Divisional Superintendent, Orpington, to be Southern Divisional Superintendent, Southampton Central.

Lt.-Colonel A. C. Payne, O.B.E., R.E., Movement Control Middle East Forces (Assistant to London Central Divisional Superintendent), to be Assistant London East Divisional Superintendent, Orpington.

Mr. P. A. White, Assistant to London East Divisional Superintendent, Orpington, to be Acting Assistant London East Divisional Superintendent, Orpington, during the absence of Lt.-Colonel Payne on active service.

Mr. John McKenzie, District Superintendent, L.N.E.R., Glasgow, whose death on January 7 we recorded in our issue of January 16, was 55 years of age, and entered the service of the old North British Railway in 1898. He was appointed Chief Assistant to the District Superintendent, Glasgow, in 1919, and District Superintendent in 1932. Mr. McKenzie represented the L.N.E.R. on the Glasgow Port Emergency Committee, and was Chairman of the Bo'ness Port Emergency Committee. He was also a J.P. for the County of the City of Glasgow.

At the funeral on January 9 Mr. R. J. M. Inglis, Divisional General Manager (Scottish Area), L.N.E.R., was represented by Mr. R. Gardiner, Superintendent, and the mourners also included the following L.N.E.R. representatives in Scotland:—Messrs. G. S. Begg, Passenger Manager; E. D. Trask, Locomotive Running Superintendent; A. Moss, Signal & Telegraph Engineer; J. H. Hunter, Solicitor; J. Johnstone, Factor; Captain H. J. Perry, Marine Superintendent; Dr. J. Sharp Grant, Medical Officer; Messrs. J. I. G. MacGregor, Assistant Engineer (representing W. Y. Sandeman, Engineer); A. Hill, District Superintendent, Edinburgh; H. B. Angus, District Goods & Passenger Manager, Edinburgh; R. S. Douglas, District Goods & Passenger Manager, Dundee; W. Lyle, District Superintendent, Burntisland; C. S. McLeod, Assistant to Goods Manager (representing A. E. Sewell, Goods Manager). The L.M.S.R. was represented by Mr. W. Yeaman, Commercial Manager (Scotland) and Mr. J. N. Phillips, Operating Manager (Scotland).

Mr. F. B. Collard, Contracts Manager of Callender's Cable & Construction Co. Ltd., retired at the end of December. Mr. Collard joined the company in 1895 and has, over a period of years, been responsible for many important underground cable contracts in all parts of the country and in Guernsey. One of outstanding interest was that of the Metropolitan Electric Tramways which included 57 miles of double track. It began in 1902 and continued for seven years and was the largest tramway electrification contract ever undertaken. Mr. Collard became Engineer for the London district

in January, 1923, and in June, 1929, was appointed Contracts Manager.

Mr. C. H. Frankland has been appointed Manager of the Underground Section of the Contract Department, as from January 1. Mr. Frankland joined the company's service in December, 1910, and since June, 1929, has been Engineer-in-Charge of the London District.

Mr. William Baird, Steamship Passenger Traffic Manager, Canadian Pacific Railway, has been elected President of the Canadian Railway Club, Montreal, the



**Mr. William Baird**

Elected President, Canadian Railway Club, Montreal

membership of which is composed of officers and staff of Canadian railway and other transport companies. Some further reference to the club is made at page 115. Mr. Baird is one of many Scots in the higher executive ranks of the C.P.R. He was born in Glasgow, and his initial shipping experience was gained in Allan Line service, and carried on with the Canadian Pacific which took over the Allan Line. With a wide experience of Canadian Pacific Steamship passenger service, Mr. Baird was appointed to his present position in 1928, and later transferred to headquarters in Canada. His energies since the outbreak of war have been devoted to Empire war service, and he is now Director of Secretariat for the Canadian Ministry of War Transport.

Mr. Sidney Garcke, C.B.E., who is Chairman of the East Kent Road Car Co. Ltd., the silver jubilee of which forms the subject of an article at page 126, has presided at all the general meetings of the company for the 25 years of its existence, and, except for 1940, when the circumstances were quite exceptional, he has been able to present a report in which a dividend was recommended. The company had held 243 board meetings up to the time of its 25th ordinary general meeting, and Mr. Garcke occupied the chair at all but two. At the 25th ordinary general meeting, held on December 16, he paid a high



*Inaugural meeting of the Railway Companies' Association Commission on Postwar Planning & Reconstruction at Euston Station on January 15*  
*Left to right: Mr. F. J. Wymer, Assistant (Planning) to the General Manager, Southern Railway; Mr. K. W. C. Grand, Assistant General Manager, G.W.R.; Sir Ernest Lemon, Vice-President, L.M.S.R. (Chairman); Sir Ronald Mathews, Chairman, Railway Companies Association and L.N.E.R.; Mr. C. K. Bird, Assistant Divisional General Manager, Southern Area, L.N.E.R.; Mr. T. E. Thomas, General Manager (Operations), London Passenger Transport Board; and Mr. H. G. Smith, Assistant to Vice-President, L.M.S.R., Secretary. (See editorial note, page 109)*

tribute to two of his colleagues. Of Mr. Alfred Baynton, Secretary, Mr. Garcke said: "As I am the only remaining original Director it will be appropriate for me on this jubilee occasion to pay tribute to the loyal and able assistance I received in the early days from Mr. Baynton, who joined me as the Secretary of the company on its registration, and who, since about the time when the character of the business changed, following the granting of a more definite status to the omnibus industry by an Act of Parliament in 1930, has taken on the additional responsibilities of management." Referring to Major C. J. Murfitt, Mr. Garcke said, "I should like also to refer to the excellent work done for the company by Major C. J. Murfitt, who joined us shortly after the Armistice in 1918, and who, finding a collection of vehicles not then very much above the level of scrap, by strenuous efforts and mechanical skill gradually re-established reliability of the services and has since remained responsible for the engineering and operational side of the organisation."

Mr. John Soame Austen, whose death on January 12, in his 81st year, we recorded last week, was educated at Felsted, where he was a contemporary of the late Lord St. Davids and his brothers. After leaving school he qualified as a solicitor and practised in the City of London. He was for a number of years associated with Lord St. Davids and his brothers in business, and was on the boards of a number of trust companies, including the following: The Colonial Securities Trust Co. Ltd. (Chairman), the Consolidated Trust Limited (Joint Managing Director), the Government & General Investment Co. Ltd. (Chairman), the Governments Stock & Other Securities Investment Co. Ltd. (Director & Manager), the International Financial Society Limited, the Municipal Trust Co. Ltd., and the Premier Investment Co. Ltd. Certain City trust companies, popularly called "the Lord St. Davids group" hold substantial interests in the British Electric Traction Co. Ltd., and until 11 years ago had a large share in the National Electrical Construction Co. Ltd. There was thus a community of interests through the common share-

holding between the British Electric Traction Co. Ltd. and the National Electric Construction Co. Ltd. In January, 1931, the B.E.T. bought practically the whole of the issued share capital of the National Electrical Construction Co. Ltd.; the latter has important shareholdings in various railway-associated and other large British bus companies. Mr. Austen joined the board of directors of the British Electric Traction Co. Ltd. on May 7, 1920, and was elected to the chair in July of the same year, an office which he has continued to hold until the time of his death. He was also Chairman of the Western Welsh Omni-

bus Co. Ltd., and the Electrical & Industrial Investment Co. Ltd., both associates of the B.E.T. Mr. Austen was also interested in a number of British-owned overseas railways. He was Deputy Chairman of the Bolivar Railway Co. Ltd., and a Director of the Argentine Great Western Railway Co. Ltd., the Villa Maria & Rufino Railway Co. Ltd., and the Ottoman Railway Holding Co. Ltd. Other transport directorates which he held included the Lancashire United Transport & Power Co. Ltd., the South Lancashire Transport Company, and the United Electric Tramways Co. of Caracas Ltd. (Chairman).



*Group taken at a visit of directors of the British Electric Traction Co. Ltd., to the Birmingham & Midland Motor Omnibus Co. Ltd., on December 5, 1935. Left to right: Mr. L. G. Wyndham Shire, Chief Engineer, B. & M.M.O.; Mr. Richard J. Howley, C.B.E., President of the British Electrical Federation, Chairman of the B. & M.M.O., Deputy-Chairman of the B.E.T., and a Director of the Buenos Ayres & Pacific Railway; the late Mr. J. S. Austen; Mr. H. C. Drayton, a Director of the B.E.T., and the Buenos Ayres & Pacific Railway, and other South American railways; Mr. L. G. Reid, Chief Assistant Engineer, B. & M.M.O.; Mr. O. Cecil Power, Traffic Manager, B. & M.M.O.*



## TRANSPORT SERVICES AND THE WAR—124

### *Government control of sleeping car reservations—Revised Railway Control Agreement and A.R.P. measures—Russian railways in the war zones—Swedish transport co-ordination—The Trans-Saharan Railway*

The Ministry of Home Security has announced the following figures of civilian casualties due to air raids on the United Kingdom during the month of December, 1941:—

Killed (or missing and believed killed)	34
Injured and detained in hospital	55

Details are as follow:—

	Men	Women	Under 16
Killed or missing	13	14	7
Injured and detained in hospital	24	24	7

#### Bus Trips to London Evacuees

To enable London parents and friends to visit children in evacuation areas, 72 special bus trips were run by the London Passenger Transport Board during the year 1941.

#### London Bus Shelters and Information Kiosks

At various bus stopping points in London, 130 shelters were installed by the London Passenger Transport Board during 1941; in addition, 20 information kiosks were erected. A dimensioned sketch of the standard London Transport portable queue shelter unit was published at page 674 of our issue dated December 19 & 26, 1941.

#### Priority Travel in South Wales

Seven of the leading motorbus operators in South Wales and Monmouthshire have drawn up a scheme, in consultation with the Regional Transport Commissioner, for the issue of priority travel permits to all persons making essential and regular journeys by bus. The companies concerned in the scheme are United Welsh Services Limited, Red & White Services Limited, Ralph's Garages Limited, the Griffin Motor Co. Ltd., the Rhondda Transport Co. Ltd., the South Wales Transport Co. Ltd., and the Western Welsh Omnibus Co. Ltd. We recorded at page 70 of our January 9 issue that the priority travel scheme of the Western Welsh Omnibus Co. Ltd. was put into operation on January 1.

#### Government Control of Sleeping Car Reservations

The Minister of War Transport has announced that from Monday last, January 19, the arrangement under which the Government has first claim on sleeping berths on certain trains was extended to include the following trains:—

Trains from London		To	Time of departure
From	Swansea		
Paddington	...	Swansea	12.55 a.m. (Sunday excepted)
	...		9.25 p.m. (Saturday only)
Euston	...	Preston	10.50 p.m. (Saturday and Sunday excepted)
Euston	...	Inverness	7.20 p.m. (Saturday and Sunday excepted)
	...		7.30 p.m. (Sunday only)
St. Pancras	...	Glasgow	9.30 p.m.
Trains to London		From	Time of departure
Neyland (via Swansea)	Paddington		
	...	Neyland	6.50 p.m. (Sunday excepted)
	...		6.20 p.m. (Sunday only)
Preston	...	Euston	10.50 p.m. (Saturday and Sunday excepted)
Inverness	...	Euston	4.15 p.m. (Sunday excepted)
Glasgow	...	St. Pancras	9.15 p.m.

The railway companies accepted bookings for journeys up to and including January 18 in the usual way. Passengers are reminded that sleeping berths must be claimed not later than half an hour before the train leaves.

The previous announcement of this kind, concerning the trains affected from December 15 onward, was published at page 673 of our December 19 & 26 issue.

#### London Transport Staff Welfare Emergency Plans

Since the war 70 small blastproof emergency canteens, fitted with electrical equipment, have been constructed to maintain a continuous refreshment service for the staff of the London Passenger Transport Board during air raids, when imminent danger prevents the continuance of normal facilities. Difficulties due to the breakdown of gas and electricity supplies have been met by the provision of field kitchens, burning scrap wood or coke, which have been constructed at 85 of the board's depots and garages. Primitive field ovens were used by our forefathers over 3,000 years ago, and the same type of oven is giving splendid service in emergencies of the present time. In addition, a quantity of emergency equipment, including mobile canteens, double-oven cookers on trolleys, portable field boilers, portable gas equipment, and reserve supplies of food and crockery, are ready at suitable points.

There are now 130 canteens catering for the staff of London Transport, of which 18 have been brought into use during the last two years. At 17 other canteens, extensions and improvements to the accommodation have been carried out to cater for the increased demand as a result of the war. Rationing, the difficulties of obtaining meals elsewhere, and the fact that in the main prices

have been maintained at pre-war level, have all contributed to this increased user, and the turnover in the board's canteens has increased by more than 100 per cent.; the canteens trade on a non-profit-making basis.

The employment of women staff in increasing numbers has necessitated the provision of rest rooms, changing rooms, protected dormitories, and additional lavatory accommodation at 120 garages, depots, and works throughout the board's properties. This work is nearing completion. Arrangements have also been made to ensure that washing and lavatory facilities for the use of women staff are available at more than 600 terminal and changeover points. In order to watch the interests of the women staff of London Transport, nine women supervisors have been appointed, and, in addition to interviewing staff for service in the canteens, their duties cover the welfare of all women staff employed in the board's garages and works. They are thus in a position to bring to the notice of the management any special requirements of the women staff not already covered by the board's arrangements. Some 9,500 women workers have replaced men as conductors, mechanics, cleaners, greasers, and for a host of similar transport jobs, during the year 1941.

"Music while you work" is also a feature of London Transport welfare activities. Programmes of gramophone records are arranged throughout the day at the board's overhaul works, and concerts, both by E.N.S.A. and by the board's own staff, are given during meal times.

#### Results of the G.W.R. Salvage Drive

In the first two years of war the Great Western Railway amassed and passed back to national war industries a scrap heap worth over £790,000. The show piece in this haul was 105,000 tons of scrap metal worth more than £500,000. The largest single item was 36,000 tons of old steel rail, valued at £180,000. Some 69,000 tons of other ferrous scrap, craned and sorted by modern electromagnetic machinery, was worth £250,000, and 1,400 tons of copper, brass, tin, aluminium, and other non-ferrous metals, another £75,000. Non-metal scrap of all kinds included everything from wood sawdust to ash-dumps, and was worth yet another £250,000. More than 2,400 tons of waste paper went to the pulping plant.

In addition, thousands of tons of disused material were sent into the company's own factories and there re-made to serve new railway uses. This saved serious delay in securing supplies of new and hard-to-get equipment. The third-year drive is now in full swing. Fresh classes are listed for combing-out; collection methods have been improved; and new reclaiming processes are at work.

#### The Revised Railway Control Agreement

An outline of the revised financial arrangements between the Minister of War Transport, the four amalgamated railway companies, and the London Passenger Transport Board, was given in the form of a White Paper, the text of which was published at page 341 of our October 3, 1941, issue. Since that time very considerable progress has been made in the preparation of details, and the Railways Agreement (Powers) Order dated December 19, 1941, has been made by the Minister of War Transport and recently published. Under this Order (Statutory Rules & Orders, 1941, No. 2074) the Minister empowers the railway companies named in the first column of Appendix A—which we reproduce in full at page 138—to enter into an agreement, in the terms of a draft which is attached to the Order, notwithstanding any statutory limitation. The new Order also provides that the London Passenger Pooling Scheme shall be suspended as from January 1, 1940, until the expiration of the last accounting period under the Railway Control Agreement. Although this agreement has not been executed, the full text is attached to the printed copy of the Railways Agreement (Powers) Order, 1941, and doubtless it represents substantially the arrangements which will be brought into effect.

It may be recorded that the Minister of Transport took control of the whole or part of the undertakings listed in Appendix A, as from September 1, 1939. It was a term of the original financial arrangements that, after the year 1940, the parties might jointly agree to a revision of the arrangements, and the present draft agreement represents the revision as from December 31, 1940, that has been agreed. The main features are:—

- the net revenue of the Pool (credit or debit) shall be paid to or discharged by H.M. Government, and H.M. Government shall pay to the controlled undertakings fixed annual sums;
- the cost of restoring war damage shall not be charged to the net revenue accounts of the controlled undertakings;



(c) the provisions relating to the adjustment of rates, fares, and charges, shall cease to have effect.

#### AIR RAID PRECAUTIONARY MEASURES

Modifications in respect of the terms of the agreements of January 11 and 16, 1939, in regard to air raid precautionary measures on the main-line railways, and the railways of the London Passenger Transport Board. Appendix D to the draft agreement sets out the new position as follows; this appendix is dated August 13, 1941:—

The parties to the respective agreements of January 11 and 16, 1939, in regard to air raid precautionary measures have agreed that such agreement shall be modified and extended in the following respects:—

(1) On November 1, 1941, each undertaking will refund to the Minister of War Transport the total of the sums paid to it by way of grant under Section 40 of the Civil Defence Act, 1939, in respect of emergency repair stores, sanction for the purchase of which had been given at a cost not exceeding £1,392,300, and no further grant in regard thereto shall be paid by the Minister. The refund of such sum shall not be a charge to the expenditure of the undertakings for the purposes of the net-revenue account. The stores shall become the property of the undertaking and be chargeable to the appropriate accounts (including, where necessary, the net revenue account) in the normal manner as and when issued for use.

(2) After deducting the £1,392,300 from the maximum grant of £4,000,000 which the Minister was prepared to make under the said Section 40, the balance amounting to £2,607,700, shall be paid to the undertakings in respect of approved expenditure on measures approved for grant as follows:—

London Midland & Scottish Railway	£ 796,700
London & North Eastern Railway	550,200
Southern Railway	362,550
Great Western Railway	340,550
London Passenger Transport Board	557,700
	<b>£2,607,700</b>

(3) Statements of approved expenditure absorbing each of the above amounts shall be prepared and agreed on the basis of the dates of authorisation of the respective works. The undertaking concerned shall make such payments to H.M. Government as fall to be made in accordance with the provisions of Section 40 (4) of the Civil Defence Act, 1939.

(4) Expenditure on approved works in excess of the amounts mentioned in paragraph (2) shall be chargeable to the net revenue account over the 39 four-weekly periods immediately following the four-weekly period in which such expenditure took place.

(5) The net expenditure (other than day-to-day expenditure on maintenance and operation) incurred each four weeks by an undertaking in carrying out any other air raid precautionary measures in

#### APPENDIX A—ANNUAL AMOUNTS TO BE PAID BY H.M. GOVERNMENT TO EACH OF THE CONTROLLED UNDERTAKINGS

Name of controlled Undertaking (1)	Minimum amounts per annum guaranteed to December 31, 1940, under original agreement (2)		Annual sum to be paid by the Government from January 1, 1941 (3)
	Amount	Base period	
1. Southern Railway Company	£ 6,163,043	Three years ended December 31, 1937	£ 6,607,639
2. Great Western Railway Company	6,144,780	do.	6,570,603
3. London Midland & Scottish Railway Company	13,465,624	do.	14,749,698
4. London & North Eastern Railway Company	9,188,960	do.	10,136,355
5. London Passenger Transport Board	4,482,369	The year ended June 30, 1939	4,835,705
6. East Kent Light Railway Company	3,283	Three years ended December 31, 1938	3,578
7. King's Lynn Docks & Railway Company*	5,319	Three years ended December 31, 1937	5,798
8. Mersey Railways Company†	100,895	Year ended June 30, 1939	109,976
9. Shropshire Railways Company	813	Three years ended December 31, 1938	886
10. Kent & East Sussex Light Railway Company	1	do.	1
11. Shropshire & Montgomeryshire Light Railway Company‡	1	Three years ended December 31, 1937	1
12. The following worked lines:—			
(a) Easton & Church Hope Railway Company	1	do.	1
(b) Fishguard & Rosslare Railways & Harbours Company§	35,543	do.	35,543
(c) Forth Bridge Railway Company	121,933	do.	121,933
(d) North Devon & Cornwall Junction Light Railway Company	6,614	do.	6,614
(e) Salisbury Railway & Market House Company¶	387	do.	387
(f) Southport and Cheshire Lines Extension Railway Company	7,732	do.	7,732
(g) Weymouth & Portland Railway Company	4,395	do.	4,395
(h) Whitechapel and Bow Railway Company	14,360	do.	14,360
(i) Great Central & Midland Joint Committee (Lessors)	70,000	do.	70,000
(j) Great Western & Great Central Railways Joint Committee (Lessors)	87,500	do.	87,500
13. The following Joint Committees:—			
(a) Cheshire Lines Committee			
(b) Great Central & Midland Joint Committee (Lessees)			
(c) Great Central & North Staffordshire Committee			
(d) Great Central, Hull & Barnsley & Midland Committee			
(e) Great Western & Great Central Railways Joint Committee (Lessees)			
(f) London Midland & Scottish & Great Western Joint Committee (Severn & Wye & Severn Bridge Railway)			
(g) Manchester, South Junction & Altrincham Railway Company			
(h) Methley Railway Joint Committee			
(i) Metropolitan & Great Central Joint Committee			
(j) Midland & Great Northern Railways Joint Committee			
(k) Norfolk and Suffolk Joint Railways Committee			
(l) Oldham, Ashton-under-Lyne & Guide Bridge Junction Railway Company			
(m) Somerset & Dorset Railway Joint Committee			
(n) South Yorkshire Joint Line Committee			
(o) Whitechapel & Bow Railway Joint Committee			
14. The following Joint Lines:—			
(a) Axholme Joint Railway			
(b) Dumbarton & Balloch Joint Railway			
(c) Dundee and Arbroath Joint Railway			
(d) East London Railway Joint Committee			
(e) Great Northern & London & North Western Joint Committee			
(f) Grangemouth Branch Railway			
(g) Great Western & Great Central (Banbury Junction Railway) Joint Committee			
(h) Halifax & Ovenden Joint Committee			
(i) Halifax High Level Joint Committee			
(j) Hammersmith & City Railway Joint Committee			
(k) London Midland & Scottish & Great Western Joint Committee (representing other joint lines of the two undertakings)			
(l) Metropolitan & London & North Eastern Railways (Watford Joint Railway) Committee			
(m) Mid Nottinghamshire Joint Railways			
(n) Otley & Ilkley Joint Railway			
(o) Princes Dock Branch Joint Railway			
(p) Swinton & Knottingley Joint Line			
(q) Tottenham & Hampsstead Joint Line			
(r) West London Extension Railway Company			
Total	£39,903,553		£43,468,705

\* No charge to be made under Article 8 of the agreement in respect of the sum of £10,081 expended in 1934 in connection with the repair work at the lock entrance but charged in the accounts for the year 1935. (Article 8 relates to maintenance charges).

† No adjustment to be made under Article 8 of the agreement in respect of the repair and renewal of additional and improved assets provided in connection with the adaptation of the plant and equipment of the Mersey Railway Company for through running with the London Midland & Scottish Railway Company.

‡ No charge to be made in the net revenue accounts of the Shropshire & Montgomeryshire Light Railway Company in connection with the liability of that company under their guarantee of the interest on the Shropshire Railways Company 4½ per cent. prior charge debenture stock.

§ That part of the undertaking situate in Great Britain and leased to the Great Western Railway Company.

¶ Railway undertaking only.

respect of its controlled undertaking either before the control period in anticipation of the present emergency or during the control period shall be spread over the succeeding 39 four-weekly periods, provided that stores (other than those referred to in paragraph (1) above), and movable equipment provided in anticipation of the present emergency are to be regarded as stocks issued on September 1, 1939, and the cost spread over the next succeeding 39 four-weekly periods.

(6) The expenditure referred to in paragraphs (4) and (5) to be charged during the period of control shall be shown as a separate item in the net revenue accounts.

(7) The prior approval of the Minister shall be obtained as regards any measure estimated to cost £1,000 or more proposed after August 13, 1941, similar to the measures referred to in paragraphs (3), (4) and (5).

(8) The terms of the agreements of January 11 and 16, 1939, as now modified will dispense with the assessment of residual values consequent upon the above expenditure.

#### Window Netting on London Transport Vehicles

Some 218,400 yd. of netting were put on London Transport vehicle windows during 1941 to safeguard passengers, 96,000 yd. on buses and coaches, 42,400 yd. on trolleybuses and trams, and 80,000 yd. on railway cars. A new development is that passengers are now to have a better view out of such windows, for diamond-shaped holes, 6 in. square, are being cut in the protective netting. Originally there were small circular holes only. Passengers then tore bigger holes, and larger (oblong) holes were cut by London Transport. Still the fabric was frequently damaged, and the repair bill amounted to well over £100 a week. Blast tests showed that any further increase in the size of the aperture would defeat the purpose of the netting. The solution to the problem is believed to have been found in the diamond-shaped hole which gives passengers a wider view of station platform or street but still affords adequate protection against blast. To discourage fabric-tearers, the edges of the apertures are being treated with a plastic compound which sets hard and securely seals them. This also helps to give the aperture a neat appearance.

#### American Freight Wagon Limits

As we recorded at page 91 of last week's issue, the Association of American Railroads has decided to limit orders for new freight wagons to 13 designs. All the new wagons will be of dimensions which will permit of free interchange over all main lines. The matter is referred to in an editorial note at page 110.

#### American Locomotives for the Near East

A feature of the U.S.A. export market during November, the last month before the entry of America into the war, was the large number of locomotives purchased for export. The U.S.A. War Department ordered 50 standard-gauge 2-8-2 type steam locomotives for export to an unannounced destination, but generally understood to be for use in Persia and the Near East. These were ordered under the Lease-Lend Act, and the materials for the engines received an A-1-a priority rating. These 50 locomotives are part of an expected purchase of 200 which was reported as long ago as September last, and it is said that the whole 200 will be completed by the summer of the present year.

During November last the U.S.A. War Department also ordered 20 metre-gauge steam locomotives of the 2-8-8-2 type for the Yunnan-Burma Railway in China, and the materials for these received an A-1-i priority rating.

#### Railway Access to Leningrad

The general progress of campaign in connection with the German invasion of Russia, and the Soviet defence, has been such that most of the important railway lines have remained in Russian hands; have passed almost in their entirety to the invader; or have been rendered virtually valueless to either side by reason of the fact that they run parallel to, and near, a section of the line of fighting. Very little attention has been given, therefore, in official communiqués of either side to announcements of the capture of a particular railway line. A notable exception is provided by the railways approaching Leningrad, and the German attack on that city severed successively the original main line from Moscow (*via* Tver), the newer Soviet-built line *via* Krasni Khalm, and eventually the approach from the east *via* Vologda and Tikhvin. Thus, on September 10 last, when the Germans occupied Schlussemburg, all railway access to Leningrad from territories remaining in Russian hands were severed. The plight of Leningrad was intensified early in November when Tikhvin, which had been used as a rail-head for supplies hauled across Lake Ladoga, was captured. Tikhvin was retaken by the Russians on December 9, and resumed its function as the rail-head for serving Leningrad with supplies dragged across the ice of Lake Ladoga. The position improved further, and very materially, on January 13, when it was announced in a Russian broadcast that food trains were again running into Leningrad

through Tikhvin and Voibokala. This has been made possible by the freeing from German interference of the railways around Schlussemburg.

It also appears that the German forces have been driven back from all contact with the railway between Moscow and Leningrad *via* Krasni Khalm, but that rail service has not yet been restored, presumably because the line requires repair. The original main-line between Moscow and Leningrad has been freed from the Germans practically throughout its length, with the exception of a section immediately to the south of Leningrad. At the time of writing the Germans are still in occupation of the junction station at Chudovo (north of Novgorod), and thus the old main line *via* Tver and Bologoe is not available for through traffic to Leningrad, even by a diversion from the old to the newer line through Chudovo and Novy Kirishi.

#### Railway Service Reductions in Hungary

A press message from Berne, dated January 12, says that the Hungarian State Railways have made drastic reductions in the passenger train services, including through international express trains. These reductions are said to result from the desire to afford maximum facilities for the transport of oil by rail from Roumania to Germany *via* Hungary. As we recorded at page 71 of our January 9 issue, the suspension of Hungarian shipping on the Danube was reported in a message of December 30. The Danube is normally frozen at this time of the year, and the winter weather at present is stated to be particularly severe.

#### Defence Areas in Canada

Immediately after the beginning of the Japanese aggression, Canadian areas designated as subject to the hazard of enemy attack were extended to include the entire Atlantic coast south of Labrador and the entire Pacific coast south of Alaska. The extension was made by an Order-in-Council on the recommendation of the joint staff committee of the three defence services. Air raid precautions have been extended in accordance with the Order. The west coast risk is considered greatest at the vital railheads of Vancouver and Prince Rupert and the lower end of Vancouver Island. On the Atlantic coast in Canadian territory the main risk is considered to include the entire mainland coast of Nova Scotia, Cape Breton, and Prince Edward Island. Lesser risk is considered to exist in New Brunswick and in Quebec along the banks of the St. Lawrence as far as Montreal. Slight risk is considered to exist in the rest of Quebec and Ontario as far west as Sault Ste. Marie. All Provincial Governments affected were notified of the desirability of developing existing air raid precautions. British Columbia has accepted an offer from the Government of Ontario of the use of the fire-fighting equipment of the Ontario Forestry Service. The equipment will be operated chiefly in the outlying areas near cities where regular civic fire-fighting services are not immediately available. It is sufficient for a fire-fighting force of between eight and ten thousand men.

#### Fuel Rationing in South Africa

Petrol rationing in South Africa is to be brought into effect on February 1. It is on the basis of permitting 400 miles of travel monthly, for private motorcars.

#### Road Traffic in France

Road traffic throughout France faces the immediate prospect of further curtailment, as the production of substitute fuels has not been sufficient to offset the rapid exhaustion of petrol stocks. At the present time road traffic amounts to only a small fraction of the normal total, and the number of motor vehicles in operation in the autumn of last year was estimated at 300,000, or only about 11 per cent. of those in January, 1940. Approximately 80 per cent. of the vehicles are lorries and buses. Some 30,000 are stated to use charcoal as fuel, and a few thousands are running on town gas, acetylene, and other alternative fuels.

#### Transport Co-ordination in Sweden

An agreement was reached last November for two Swedish railway administrations to acquire financial interests in three important road motor companies controlled by the Svea Bolaget, the prominent Swedish coastal shipping company. The three road companies are the Aktiebolaget Svenska Godsbilcentraler, the Aktiebolaget Landtransport, and the Aktiebolaget Nordisk Biltjänst. For administrative purposes the three form one large group, and their goods services cover practically the whole of Sweden. The Trafikförvaltningen Göteborg-Dalarna-Gävle (a group of private railways) purchased half of the Svea interest and sold to the Swedish State Railways three-fifths of that half at the same price as it had paid. The sale to the State Railways amounted to 1,500 shares in the Svenska Godsbilcentraler, valued at 150,000 kronor; 1,800 shares in the Landtransport, valued at 180,000 kronor; and 525 shares in the Nordisk Biltjänst, valued at 78,750 kronor. The idea of this transaction was that the State Railways should participate financially in the door-to-door services operated by the private railways, particularly in those places where junction stations are



common to both State and private railways. The shares of the three road motor companies have been divided into two equal series, the "A" series owned by shipping interests, and the "B" series railway-owned.

#### Motor Vehicles in New South Wales

Motor vehicles registered in New South Wales at the beginning of September last totalled 300,730, a decline of 11,608, or 3.7 per cent., in twelve months. In two years the reduction in registrations has totalled 28,489, or 8.6 per cent., and registrations are now at the lowest figure since November, 1937. There were 1,077 motor vehicles operating on producer gas at the beginning of September last, including 693 lorries and vans, 353 cars, and 23 taxicabs.

#### Producer-Gas Motor Vehicles in Belgium

According to a recent census taken in Belgium, that country has now 6,168 motor vehicles equipped for producer gas or other types of substitute fuel, including 3,762 vehicles operating on pressure gas. Originally it was intended to convert at least 1,000 vehicles a month to the use of substitute fuels, but, owing to shortage of raw material for the manufacture of the plants, it has proved impossible to fulfil the programme. In August and September, 1941, only 1,378 motor vehicles were converted.

#### Producer-Gas Vehicles in Australia

A recent census completed by the Gas Producers & Manufacturers' Association shows that 2,330 vehicles equipped with charcoal producer-gas units were in use in Victoria on August 7, 1941, and 5,432 units were on order. Manufacturer's sales over the next three months were estimated at 11,932 units, bringing the total number of vehicles so equipped in Victoria to 18,000 before the end of the year.

It was estimated that, in the whole of Australia, 30,000 vehicles would be equipped with producer-gas units by the end of the year 1941. More than 15,000 tons of charcoal a month will be needed for these units, which will be worth upward of £1,000,000 per annum to charcoal burners. This should replace an annual consumption of more than 9,000,000 gallons of petrol, on the basis of estimates that producer-gas units are used mostly on vehicles doing a large annual mileage, necessitating the use of at least 30 gal. of petrol a month.

#### The Trans-Saharan Railway

Reports on the progress of the Trans-Saharan Railway are conflicting and give little indication as to whether construction work is even in progress at any place excepting at the northern end of the new line, in the neighbourhood of Colomb Béchar. Long and speculative articles in the American press, of which notable examples were those in the *New York Herald Tribune* of November 6, and the *Christian Science Monitor* of November 7, stated that the Trans-Saharan Railway was being rushed to completion on German orders so as to facilitate the establishment at Dakar of a German naval base. This is not borne out by official Vichy statements, which have expressed doubt as to whether even the next 100 km. (62 miles) can be completed during 1942, and this distance is, of course, only a fraction of the total over which rails must be laid before through connection is established between the Mediterranean and the Atlantic coast of West Africa. During November last it was announced that a supplementary credit of fr. 113,000,000 had been allocated for the construction of the Trans-Saharan Railway, and that this amount was in addition to the fr. 150,000,000 allocated several months earlier. The declared intention of the Vichy Government last November was to make available sufficient credits to extend the Bou Arfa to Kenadza section to a point 12 miles from Colomb Béchar.

The full scope of the Trans-Saharan Railway was outlined in *THE RAILWAY GAZETTE* of November 28 last (page 559) and the accompanying sketch map then showed the approximate course of the lines. The scheme at present being undertaken is now known in France as the Mediterranean-Niger Railway, as it is but part of the full ambitious plan. M. Yves Chatel, then Deputy Governor-General of Algeria (he has since succeeded General Weygand as Governor-General), associated the railway with the whole question of the development of French African resources, in the course of his address to the meeting of the Chambers of Commerce of the Mediterranean held at Marseilles last September, and reported in *Le Temps* of September 27 and 28. He said that the Mediterranean-Niger Railway would be the route of cotton and coffee, and that its building was a proof of the constructive energy of France and her African possessions. General Weygand had achieved the long-desired co-ordination between the different African administrations and between Africa and France, and a further effort was needed to ensure close liaison between the French and African commercial organisations concerned. According to *Le Temps* of December 8, 1941, the report of the important Société Commerciale de l'Ouest Africain announced that the trade re-established between France and North Africa since the Armistice was satisfactory in the circumstances. African products had been bought mainly on

Vichy Government account, and it was to be hoped that this system would continue.

The information available at present still leaves some doubt about the precise route of the Mediterranean-Niger Railway immediately to the south of Bou Arfa, a matter which we discussed at page 559 of our November 28 issue. It now seems probable, however, that the main line runs more or less direct from Bou Arfa to Colomb Béchar, leaving Kenadza (to the west) to be served by a standard-gauge branch. In fact, reports of openings to traffic last year of various sections (the last on November 19) may have referred to portions southwards from Bou Arfa, including a branch to the Kenadza coal mines. Cerebral opening was not undertaken until the railway was completed to Colomb Béchar, when the whole section between Bou Arfa and Colomb Béchar was formally inaugurated on December 8, by M. Berthelot (Vichy Minister of Communications), General Noguès (Resident-General of Morocco), M. Chatel (Governor-General of Algeria), and Admiral Fénard. M. Berthelot travelled in what was described as a streamlined coach forming part of a diesel-electric train, from Bou Arfa (the terminus of the existing standard-gauge line from the coast) to Colomb Béchar, and thence to the coal mines of Kenadza, a distance of 165 km. (103 miles). Various demonstrations were organised in honour of the event, and the Minister made a short speech in which he recalled the difficulties encountered in the construction of the railway, and spoke particularly of the need to open up the coal mines of Kenadza, and the other mineral resources of the region south of Colomb Béchar. M. Berthelot himself saw the departure of the first coal train up this line. He also referred to the new development which had been made possible by the great irrigation works undertaken there. This speech was reported in *Le Temps* and *Le Petit Journal* of December 10, 1941.

In interviews given to the *Gazette de Lausanne* and to *Figaro* of December 12, M. Berthelot gave further details of the mining basins now being opened up. The coal produced at Kenadza was of excellent quality, he said, and annual production, which was now only 10,000 tons, could in future reach a million tons. The railway would be continued in the immediate future to a point 100 km. (62 miles) south of Colomb Béchar, where coal had been discovered in the basin of Guir, if the deposits proved rich enough. It was hoped that this basin would produce between 7,000 and 8,000 tons monthly at the beginning of 1943, but work could not begin until the railway reached there. Work was already in progress on the next section of railway. This new production should solve the coal problem in Algeria and thus relieve the strain on French coal supplies. Exploration for minerals was proceeding at further points on the proposed route of the railway, and M. Menchikov, the "well-known geologist," had established a research centre at Beni Abbas. He hoped to find coal at Reggan, further south, and was also looking for copper. The Vichy authorities are thus at some pains to emphasise the commercial justification for the new railway, and to suggest that the stage-by-stage progress of the line is closely associated with the discovery of mineral deposits, in much the same way as the northward extensions through Rhodesia of the "Cape-to-Cairo" Railway were made in connection with mineral finds. It is, of course, possible that this propaganda policy conceals intensive construction of desert sections of the Mediterranean-Niger Railway by German interests. The *Pariser Zeitung* of December 9 concentrated more on the agricultural possibilities of the Niger Valley than on the coal resources of the Sahara, and said that, as a result of the new irrigation works, it was hoped to plant 510,000 ha. with cotton, and 450,000 ha. with rice. The railway would become economically profitable only if the Niger Valley were fully exploited and large quantities of cotton and rice could be transported.

In the course of his various announcements in the early part of December, M. Berthelot frequently referred to the shortage of heavy oil for the cranes, etc., and of steel for the rails. The diesel-electric locomotives used on the line needed heavy oil for fuel. According to a story given to the *St. Louis Plain-Dealer* (October 20, 21, & 22, 1941) by a former member of a French labour battalion in North Africa who had escaped to America, thousands of tons of steel were expected from America for the railway, but in August it appeared that this would not arrive. An Associated Press message from New York, published in *The Daily Mail* of October 8, said that British destroyers had captured a French merchantman carrying railway equipment from Bordeaux to Casablanca for use on the Trans-Saharan Railway. The *St. Louis* story said that cement production in Casablanca had slowed down, and virtually none was left for the railway. The author gave a harrowing account of conditions in the labour camps along the railway line. The workers were mostly foreigners, he said, and a number of them were Foreign Legionaries. There were 6,500 foreigners in the labour battalions in Morocco, working mostly on the railway; 2,500 were from Central European countries, and 4,000 were Spanish Republicans.



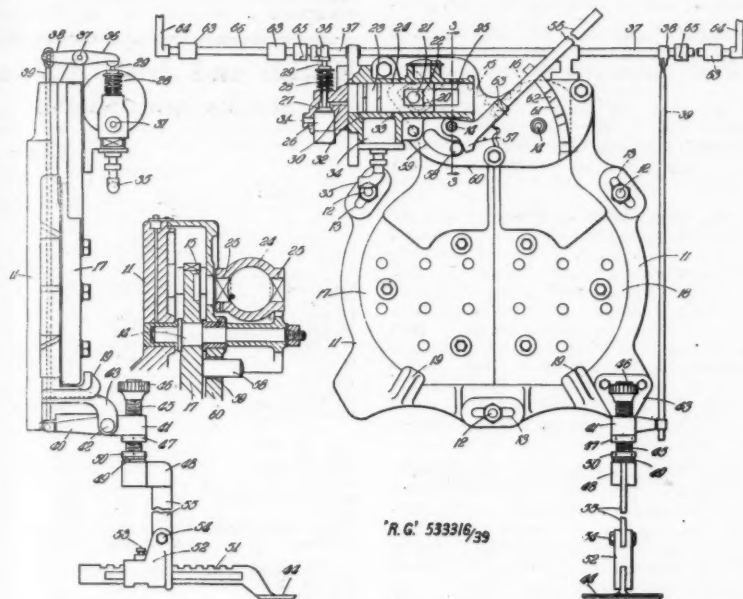
## ABSTRACTS OF RECENT PATENTS\*

**No. 533,316. Locomotive Fire-doors**

John Dalrymple Rogers, of 3, Eldon Road, Kensington, London, W.8, and Whitelegg & Rogers Limited, of Grand Buildings, Trafalgar Square, London, W.C.2. (Application date: September 14, 1939.)

A locomotive fire-door frame 11 is attached to the back of the fire-box by bolts 12 passing through slots 13. Pins 14 act as fulcrums for toothed quadrants 15

forms part of bracket 48. Manual operation of the fire-door is effected by the lever 56 which is provided with a lug 57 to engage a pin 58 on quadrant 15, the pin projecting through a slot 59 in a plate 60 attached to frame 11. Projection 61 on the plate 60 has a number of recesses 62 for receiving lever 56 so that the fire-door halves 17 and 18 may be held in a number of positions, the top part of lever 56 being movable at 63 with



and 16 carrying the halves 17 and 18 or the door, which are held against the frame 11 by lugs 19 when in the closed position. Quadrant 15 has a slot 20 to receive a roller on a pin 21 extending through piston 23 and supported on cross-heads 22 which travel in slots 25 in the cylinder 24. The arrangement is such that piston 23 is moved to the right when pressure fluid is admitted to the left hand end of cylinder 24, thus opening the fire-door through the action of pin 21 on quadrant 15. On release of fluid pressure the fire-door closes under gravity. Cylinder 24 has a chamber 26 for a valve 27 closed by a spring 28 acting on stem 29, this chamber having an inlet 30 for pressure fluid through connection 31, and the cylinder also has exhaust ports 32, 33 leading to exhaust chamber 34 and exhaust pipe 35. Port 32 provides a cushioning effect. Valve 27 may be opened by a tappet lever 36 on a shaft 37. Lever 38 has pin and slot connection with a rod 39, the lower end of which is connected to one arm 40 of lever 41, pivoted at 42 to bracket 43. Pedal 44, for operation by the fireman's right foot, is connected to lever 41 by means of a threaded adjusting rod 45 with a knurled head 46 and lock nut 47, the bracket 48 being pivoted at the lower end of rod 45 and locked thereto, in any desired angular position, by serrated parts 49 and lock nut 50. The pedal 44 is carried by a notched bar 51 which is fixed in any desired position in fitting 52 by a set screw 53. Fitting 52 is pivoted at 54 to a rod 55 which

respect to the lower part. To enable the fire-door to be opened from the side of the cab, extensions 66 of shaft 37 may be carried in bearings 63 fixed to the boiler, the extensions 66 having operating levers 64 connected with shaft 37 through dog clutch mechanism 65. Normally the fire-door would be operated by pedal 44 or handles 64 which admit steam or air under pressure to cylinder 24.—(Accepted February 11, 1941.)

**No. 533,716. Lighting**

J. Stone & Co. Ltd, of Deptford, Kent, and Leslie Reginald Nixon, of 54, Sidewood Road, New Eltham, London, S.E.9. (Application date: August 18, 1939.)

In an electric installation for lighting a railway vehicle by gas-discharge lamps, which require a constant alternating current, an inverted converter device has its input connected with a variable-voltage source of direct current and its output connected with the lamps, the speed of the converter being controlled to keep the current in the lamps constant. In Fig. 1 an axle-driven dynamo D is connected by a change-over switch *vw* to the battery 1 or the battery 2, and a cut-in switch *xx* is included. Circuit *a* supplies direct current to a converter *c*. Gas-discharge lamps *L*, each in series with a choke *s*, are supplied with current from the converter *c*. The usual lamp resistance *r* is connected between circuit *a* and the dynamo. In Fig. 2 the series field winding *b* of an inverted converter *c* is included in circuit *a*, the lamps being supplied through circuit *d*. A shunt

field winding *e*, in series with a carbon pile *F* of a carbon pile regulator, is connected across the converter, the controlling winding *g* of the regulator being connected across a full-wave rectifying

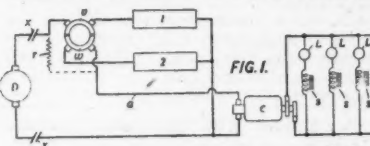


FIG. 2.

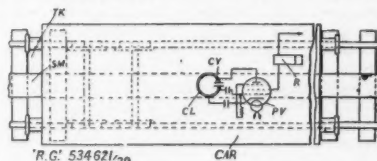
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bridge *h* which is in series with an iron-core choke *j*. A rheostat *k* may be used in conjunction with choke *j* across circuit *d*.—(Accepted February 19, 1941.)

**No. 534,621. Signalling**

Standard Telephones & Cables Limited, Roy Mayne Barnard, Andrew Brown, Frank Lewis John Jarvis and Robert McCloaghrie, all of Connaught House, 63, Aldwych, London, W.C.2. (Application date: August 25, 1939.)

A device for use on a train to indicate approach to a signal for some similar purpose consists of a current-responsive device such as a relay connected in the screen-circuit of a normally-oscillating screen-grid valve, so as to be normally energised, but de-energised by damping of the oscillation of the valve in passing a fixed track unit. Mounted under one of the carriages *CAR*, is a coil *CL* with its axis perpendicular to the track *TK*. The coil is tuned by a capacity *CY* such that the natural frequency of the combination occurs at the minimum decrement of the coil, this resonator being driven by a pentode valve *PV* connected as shown. A relay or other electro-mechanical device *R* is connected in the valve screen circuit. The fixed track unit consists of a sheet of metal *SM* laid along the centre of the track *TK*. If the coil *CL* passes near the metal *SM*, the eddy current effects cause the valve anode current to increase and the valve screen current to decrease and so release the relay *R*. Breaks in the anode circuit can be indicated by providing a continuously-operated relay in the anode



circuit. In each case this relay or the relay *R* operate a bell or a steam whistle on being released.—(Accepted March 12, 1941.)

COMPLETE SPECIFICATIONS  
ACCEPTED

534,305. Newland, W. Y. Current collectors for electrically-propelled vehicles.

534,569. Woodard, W. E. Valve gear for fluid-pressure engines such as locomotive engines.

534,621. Standard Telephones & Cables Limited, Barnard, R. M., Brown, A., Jarvis, F. L. J., and McCloaghrie, R. Signalling to moving vehicles.

\*These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. The full specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. price, 1s.

## Notes and News

**Great Southern Railways Debenture Stock.**—Holders of Great Southern Railways £637,892 four per cent. debenture stock, which is due for redemption at par on March 31 next, are to be given the option of redeeming the whole or part of their holding or of re-investing the whole or part in a similar issue redeemable in 1947.

**Permanent Way Institution London Meeting.**—A lecture will be given by Mr. George Dow, Information Agent, L.N.E.R., on the activities of the L.N.E.R. in war-time at a meeting of the London Section of the Permanent Way Institution which has been arranged for Saturday, February 14, at 2.30 p.m. at the Albert Stanley Institute, Hammersmith Broadway, S.W.6.

**Assam-Bengal Railway Co. Ltd.**—At an extraordinary general meeting of this company held on January 1, a special resolution was duly passed to the effect that the Assam-Bengal Railway Co. Ltd. be wound up voluntarily, and that Raymond Lewis Bliss, a director of the company, be appointed liquidator for the purposes of such winding up and that his remuneration be fixed at £800.

**Great Southern Railways (Eire).**—For the 1st week of 1942 the Great Southern Railways (Eire) reports passenger receipts of £32,236 (against £32,509), and goods receipts of £68,918 (against £54,014), making a total of £101,154, against £86,523 for the corresponding period of the previous year.

**Snowstorms Cause Accidents in Spain.**—As a result of snowstorms during the cold wave in Spain several railway accidents have occurred. An express ran into a goods train near Castejon, on the Zaragoza-Bilbao line, and several persons were injured. A goods train was derailed in snowdrifts near Avila, and communication with the city is cut off. The Pajares pass was blocked by snow and snowploughs worked ceaselessly at Reinosa to keep the Northern Line open. Serious delays are reported throughout the whole of the northern provinces.

**U.S. Higher Freight Rates Demand.**—A request for higher freight rates has been made by the U.S.A. railways and water carriers. Both have asked that the Interstate Commerce Commission permit them to raise passenger and freight rates by 19 per cent. to pay for their increased operating expenses. Mr. Chester Moore, Secretary of the American Trucking Association Incorporated, stated, according to Reuters, at the Interstate Commerce Commission hearing on January 7, that the road haulage industry would demand a rate increase equal to any granted to the other transportation lines.

**Exceptional Rates in Eire.**—The Great Southern Railways Company proposes an increased scale of exceptional rates and charges for the carriage of peat and firewood by merchandise train, to operate as from the expiration of 30 days from January 10. The proposed rates per ton vary from 1s. 9d. for 3 miles to 23s. for 270 miles. For peat a minimum of 4 tons per truck—owner's risk, owner to load and unload—station to station. For firewood in Class 3—minimum 6 tons per truck—owner's risk, owner to load and unload—station to station. Objections to the proposed increases must be filed with the Registrar of the Railway Tribunal, La Touche Buildings, Castle Street, Dublin, before the above-mentioned expiration of 30 days.

**Reclaiming Worn Parts.**—The Reclamation of Worn Parts by Metal Spraying is the title of a paper, of particular value at the present time, published in the January, 1942, Journal of the Institution of Automobile Engineers. The author is Mr. W. E. Ballard, A.I.C.

**U.S. Railways Freight Loadings.**—Statistics issued by the American Railway Institute show that loadings of revenue freight for the week ended December 27 totalled 606,500 wagons, a decrease of 92,200 on last week and an increase of 61,200 wagons on the same week last year.

**Rectifier Vacuum.**—The 1941 report of the Electrical Section of the Association of American Railways contains reference to a new development which allows for supplanting the vacuum of a substation mercury arc rectifier with nitrogen, thus permitting the removal of anodes or other internal parts without the necessity of a subsequent bake-in.

**The Paris Metro in 1941.**—According to preliminary estimates, says the official German news agency, quoted by Reuters, the Paris underground railway carried about a thousand million passengers in 1941, and the company's earnings amounted to over a thousand million francs. These figures follow quickly on the report to December 31, 1940, by the Compagnie du C. de f. Metropolitan de Paris, which reached this country recently and which was the subject of an editorial article in last week's issue.

**New Bus Station at Glasgow.**—David MacBrayne Limited, the well-known Scottish shipping and road transport company, opened a new bus station on Monday, January 12, at Road Transport House, 232-236, Broomielaw, Glasgow, between McAlpine and Washington Streets. As from that date the company's road services to Inveraray, Lochfyneside, Lochgilphead, Ardrishaig, Tarbert, and Campbeltown, have used the new station instead of beginning and terminating at the company's offices, 44, Robertson Street, Glasgow. The new bus station includes a garage, goods clearing station, drivers' hostel, booking office, and refreshment room.

**Press Visit to London Marshalling Yard.**—On Tuesday last, members of the press were enabled to inspect a large London traffic-control office and marshall yard consisting of several independent marshall yards, one for hump shunting and the others for flat shunting. The yardmaster explained that, due to the varied traffic, approximately 52 movements (comprised of 2,800 wagons) have to be made daily between the various sections of the yard, and of these 36 are worked across the main lines. Notwithstanding the complex layout, the shunting and disposing of a train after arrival averages not more than 20 min., notwithstanding the fact that there have been 576 air raid alerts in the district, including a period in which raids occurred on 83 nights out of 84, but the work in the yard went on virtually without interruption despite numerous "incidents."

**Bengal-Nagpur Railway Co. Ltd.**—Presiding at the ordinary general meeting of this company on January 15, Sir Charles Stewart-Wilson, the Deputy-Chairman, said that gross earnings had reached a record and exceeded last year's receipts by over 107 lakhs, while net earnings were nearly 118 lakhs better. The savings were, however, largely the result of enforced reductions in special replacements and renewals which would have to be made up later.

The company's share of surplus profits amounted to Rs. 13,33,747. Till the question of the company's liability to Excess Profits Tax in India was settled, about 10½ lakhs of these surplus profits had to be retained in India to meet possible demands. Negotiations were in active progress in India on this matter. In this country the Inland Revenue authorities had agreed to a 6 per cent. profits standard under Section 27 (2) of the Finance Act, 1940.

**Huddersfield Joint Services.**—The Huddersfield Town Council on January 7 confirmed a decision of the Passenger

## British and Irish Railway Stocks and Shares

Stocks	Highest 1941	Lowest 1941	Prices	
			Jan. 16, 1942	Rise/ Fall
G.W.R.				
Cons. Ord. ....	43½	30½	44½	— ½
5% Cons. Pref. ....	109½	83½	109½	—
5% Red. Pref. (1950) ..	105½	96½	106½	—
4% Deb. ....	113½	102½	113½	+ 1
4% Deb. ....	115	105½	114	—
4% Deb. ....	121½	112	120½	+ 1
3% Deb. ....	132	122	128	—
2½% Deb. ....	70	62½	69	+ 1
5% Rt. Charge ....	129½	116	129½	+ 1
5% Cons. Guar. ....	128	110½	129½	+ 1
L.M.S.R.				
Ord. ....	17½	11	17½	—
4% Pref. (1923) ....	53	33½	51½	— 1
4% Pref. ....	68½	48½	68½	—
5% Red. Pref. (1955) ..	97½	77	95½	—
4% Deb. ....	105½	97	108	+ ½
5% Red. Deb. (1952) ...	110½	106½	109½	—
4% Guar. ....	100	85½	100½	—
L.N.E.R.				
5% Pref. Ord. ....	3½	2½	3½	— ½
Def. Ord. ....	2	1½	2½	—
4% First Pref. ....	52½	33	50½	— 1
4% Second Pref. ....	19½	10	20	—
5% Red. Pref. (1955) ..	79½	52	78½	—
4% First Guar. ....	90½	74½	90½	+ 1
4% Second Guar. ....	80½	59	79½	—
3% Deb. ....	79½	68½	80	+ ½
4% Deb. ....	104½	91½	105	+ ½
5% Red. Deb. (1947) ...	106	102½	104	—
4% Sinking Fund Red. Deb. ....	103½	99½	102½	+ 1
SOUTHERN				
Pref. Ord. ....	65½	43½	63½	— ½
Def. Ord. ....	15½	9	15½	— 1
5% Pref. ....	107	77½	106½	—
5% Red. Pref. (1964) ...	107	89½	106	—
3% Guar. Pref. ....	128	111	128½	+ 1
5% Red. Guar. Pref. (1957) ....	114½	107½	113½	—
4% Deb. ....	112	102½	113½	+ 2
4% Deb. ....	130½	119	128½	—
4% Red. Deb. (1962- 67) ....	108½	102	107	—
4% Red. Deb. (1970- 80) ....	108½	102½	107	—
FORTH BRIDGE				
4% Deb. ....	99½	90½	98½	—
4% Guar. ....	99	85½	98½	—
L.P.T.B.				
4% "A" ....	120½	109½	119½	+ 2
5% "A" ....	130½	115½	129	—
4% "T.F.A." ....	103½	99½	100½	—
5% "B" ....	117	102	117½	+ 2
"C" ....	46½	28½	40	—
MERSEY				
Ord. ....	24½	19½	22½	—
4% Perp. Deb. ....	100	90	99½	—
3% Perp. Deb. ....	73½	63	72½	—
3% Perp. Pref. ....	58	51½	57	—
IRELAND BELFAST & C.D.				
Ord. ....	4	4	4	—
G. NORTHERN				
Ord. ....	14½	3	13½	— ½
G. SOUTHERN				
Ord. ....	14½	5	10½	—
Pref. ....	17	10	11½	—
Guar. ....	44	16	42	+ 1
Deb. ....	61	42	55½	+ ½



## Official Notice

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Friday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

## London and North Eastern Railway

NOTICE is hereby given that the Directors have fixed January 29th at the close of business as the date for striking the balances of the Company's Guaranteed, Preference and Ordinary Stocks. Final Dividends declared for the year ended 31st December, 1941, will be payable only to the Stockholders whose names are registered in the books of the Company on the date so fixed.

Deeds of Transfer should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5.0 p.m. on 29th January.

By Order,

P. J. DOWSETT,  
Secretary.

Marylebone Station,  
London, N.W.1.  
19th January, 1942.

TRAFFIC INSPECTOR required for the Nigerian Government Railway, for two tours of 12 to 24 months with possible permanency. Salary, £400 rising to £580 a year. Outfit allowance £25. Free passages and quarters. Candidates not over 38, must have received a good all round training on a Home Railway both on inside and outside work preferably in both operating and commercial departments. They should be capable of undertaking train operating, rolling stock distribution, claims, staff matters, general correspondence and the inspection, supervision and execution of general railway traffic working. Write, stating age and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/9767.

Transport Committee not to pursue a scheme for running trolleybuses from Lockwood Church to Honley. The committee recommended that conveyance of traffic on the section be left to the Joint Omnibus Committee on three conditions: payment by the joint committee to the corporation of £2,922 annually; the committee to maintain an adequate service between Huddersfield and Berry Brow (the section within the borough boundary); fares within the borough to be kept on the existing level so far as possible with economic working; and the arrangement to operate from October 1 last. The Huddersfield Joint Omnibus Committee was formed under an agreement of May 16, 1930, as a partnership between Huddersfield Corporation and the L.M.S.R. Under this agreement the L.M.S.R. participates in all the Huddersfield Corporation bus services on a 50-50 basis.

## Questions in Parliament

## Level Crossing Gates

I have no evidence of the danger to road transport during blackout hours of indicating closed level crossing gates by means of a red lamp, but I shall be happy to look into any particular case. (Colonel J. J. Llewellyn, Joint Parliamentary Secretary, Ministry of War Transport, January 8.)

## Railway Sleeping Berths

Representations have been received from seven Chambers of Commerce in Scotland and from the Merchants' House of Glasgow to the general effect that, while they recognise the national need which has occasioned the reduction of sleeping car facilities, the claims of business men to a fair share of the berths available should have consideration. The Minister of War Transport is anxious to ensure a fair distribution of the limited accommodation among all classes of persons necessarily travelling on urgent and important Government business, and he has arranged that any such person may apply to the Government Department concerned in the business, and that Department will, if it supports the application, request the Ministry of War Transport to reserve a berth. (Colonel Llewellyn, January 8.)

## Women Railway Workers

The rights of women workers in the clerical departments of the railway companies have been safeguarded as to their reinstatement after the war and continuity of membership of superannuation fund, when such employees have been on the permanent staff, and have permission from the company to join such forces as the Women's Royal Naval Service. (Colonel Llewellyn, January 8.)

## Railway Accident at Eccles

The unfortunate accident at Eccles station on Tuesday, December 30, occurred at 8.30 a.m. during a dense fog, when one passenger train came into sidelong collision with another travelling in the opposite direction. I regret to say that 20 passengers were fatally injured and 81 others and two engine-men were detained in hospital. Great assistance was rendered by local rescue parties and I should like to thank them for their prompt help. An Inspecting Officer of Railways has been appointed to hold an inquiry and until his report has been received I am not in a position to make any statement as to the cause. I am sure I am expressing the feelings of the House in conveying our sympathy to the relatives of those who lost their lives and with those who were injured. (Colonel Llewellyn, January 8.)

## Railway and Other Reports

**Buenos Ayres & Pacific Railway Co. Ltd.**—The directors announce that six months' arrears of interest to January 1, 1937, is being paid on the 4½ per cent. consolidated debenture stock, and that £136,000 is being paid to the Argentine Great Western Railway Co. Ltd. to enable that company to distribute on its 5 per cent. debenture stock six months' arrears to April 1, 1937.

**East Midland Motor Services Limited.**—Net traffic receipts, etc., for the year to September 30, 1941, amounted to £164,287 (£112,138). Fuel taxation and licences required £22,840 (£19,027), and provision for income tax and E.P.T. £122,400 (£71,300). Dividend for the year on the £250,000 of ordinary capital is 7 per cent. tax free (8 per cent. tax free) and £8,784 is carried forward. The company is controlled by Tilling & British Automobile Traction Limited (which in turn is controlled jointly by the British Electric Traction Co. Ltd. and Thomas Tilling Limited) in conjunction with the L.N.E.R. and L.M.S.R.

**Dublin United Transport Co. Ltd.**—The present title of this company, formerly Dublin United Tramways Co. (1896) Ltd., was adopted in April last. The final dividend is 3 per cent., making 5 per cent. for the year 1941 (4 per cent.), after providing £160,000 for taxation. The amount carried forward is £23,533 (£21,561 after writing off £35,000 for premises).

**National Omnibus & Transport Co. Ltd.**—This company, a subsidiary of Thomas Tilling Limited, reports for the year 1941 a gross profit of £163,625 (£182,223). After deducting directors' fees and £73,000 (£65,000) for taxation the net

profit is £90,037 (£116,635). Ordinary dividend is 5½ per cent. tax free (7 per cent. tax free), and £5,489 (£10,000) is allocated to reserve, leaving £30,256 to be carried forward, against £31,958 brought in.

**Highland Transport Co. Ltd.**—The report to September 30, 1941, of this company, in which the L.M.S.R. holds a 50 per cent. interest, shows a gross trading profit of £21,694 (£14,076). After depreciation, directors' fees, E.P.T., and income tax, and adding £993 brought forward, there is a credit balance of £2,515 (£4,502). The directors recommend a dividend of 1s. 3d. a share (1s. 6d.), less tax, absorbing £1,094 (£1,509), and that £500 (£1,000) be placed to general reserve, leaving £921 to be carried forward.

**Tilling & British Automobile Traction Limited.**—This undertaking, which is controlled jointly by the British Electric Traction Co. Ltd. and by Thomas Tilling Limited and is a purely holding company, secured in 1941 a net profit, after taxation, of £581,974 (£567,836). The directors recommend a final dividend of 4 per cent., plus 2 per cent. participating dividend, again making 10 per cent., less tax, for the year on the 8 per cent. cumulative participating preference shares. On the ordinary shares the final dividend is 3½ per cent., tax free (same), making, with the 3 per cent. interim, 6½ per cent., tax free, for the year, compared with 7 per cent. tax free for 1940.

## Contracts and Tenders

The Bengal-Nagpur Railway has placed an order with I.C.I. (Metals) Limited for 74 copper pipes to the inspection of Messrs. Wolfe Barry, Robert White & Partners.

According to "authoritative circles" quoted in a recent broadcast by Radio Paris, the French locomotive industry is engaged on an order for the construction of 400 locomotives. The source of these orders, and the destination of the locomotives is not stated, but according to the United States Department of Commerce the execution of the programme is expected to occupy until 1947.

## Forthcoming Meetings

Jan. 30 (Fri.).—Fishguard & Rosslare Railways & Harbours Company (half-yearly ordinary), Paddington station, W.2, at 1 p.m.

Feb. 26 (Thurs.).—Grand Canal Company (annual general), Grand Canal House, James's Street Harbour, Dublin, at 3 p.m.



### Railway Stock Market

Stock Exchange markets have been affected by the war news from Malaya and the Far East, and pending further developments, the volume of business contracted and the general price trend was reactionary. Nevertheless, there was again no heavy selling, and firmness was maintained in British Funds. In many instances home railway prior charges remained in steady demand, but they are, of course, held firmly and in small supply. On the other hand, although a better tendency appears to be developing at the time of writing, junior home rail stocks were slightly lower at one time, due to absence of improvement in demand, no heavy selling having been reported. Surrounding market conditions have not been conducive to an increase of speculative activity, despite the approaching dividend announcements. Nevertheless, should rather higher payments be made in some instances, there would apparently be scope for satisfactory improvement in market prices. If, as is now being generally assumed, dividend payments were unchanged, yields would, of course, remain substantial and out of line with those on most other groups of ordinary or equity securities. The large yields are a reflection of the fact that it is very difficult to assess the dividend outlook until the position in regard to war damage contributions is clarified, and there is also uncertainty whether the railways intend to regard the latter as a charge against

capital, or profits. In accordance with the trend on the Stock Exchange, an easier tendency developed in Argentine railway securities, following their recent advance, although a good impression was created by traffic receipts; attention was given in the market to the improvement in the latter, shown during the past six months. Subsequently prices tended to improve. There was a fair amount of activity in Central Argentine 4 per cent. debentures on hopes that the position may have recovered sufficiently to permit a payment on this stock in the near future. Taltal and Nitrate Rails shares were marked higher, and Antofagasta preference showed a further gain, sentiment being influenced by the possibility of substantial increase in demand for nitrate by the U.S.A.

Great Western ordinary moved back to 43½, but later recovered to 44½. The guaranteed and 5 per cent. preference stocks held their recent gains to 129½ and 109½ respectively, while the 4 per cent. debentures were half-a-point higher at 113½. There has been further demand for L.M.S.R. 4 per cent. guaranteed; the yield is regarded as not unattractive, bearing in mind the excellent investment merits, and the current price is 101, compared with 100½ a week ago. L.M.S.R. ordinary, however, eased from 17½ to 17½, but later rose to 18. The senior preference was maintained at 69, although at the time of writing the 1923 preference has improved from 51½ to 52. L.M.S.R. 4 per cent. debentures at 108 were a point

higher on balance. Among L.N.E.R. debentures, the 4 per cents. were fractionally higher at 105½, and the 3 per cents. maintained their recent rise to 79½. Furthermore, this railway's first guaranteed improved to 91½ compared with 90½ a week ago. The second guaranteed gained half-a-point to 80. L.N.E.R. first preference at 51 was better on balance, and the second preference little changed at 19½, compared with 20 a week ago. Southern issues reflected the general trend, the prior charges having tended to move higher, while subsequently, higher prices also ruled for the junior issues. The deferred was 15½, as against 15½ a week ago, and the preferred, after moving back to 62½, has rallied to 63 at the time of writing. Southern 4 per cent. debentures rose further from 112 to 113½ and now have the same quotation as the equivalent stock of the Great Western. Southern guaranteed stock was higher at 129½, and the 5 per cent. preference maintained its recent rise to 107. London Transport "C" at 40½ was virtually unchanged on balance.

Elsewhere, Canadian Pacific issues became easier, but the 4 per cent. preference at 65 was unchanged on balance; the market remains hopeful of a forthcoming resumption of dividends on the ordinary stock. Among foreign railway issues, Antofagasta preference rose strongly to 38. B.A. Gt. Southern 4 per cent. debentures eased to 62, but Central Argentine 4 per cent. debentures had a steady appearance at 42½.

### Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1941-42	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffic to date			Shares or Stock	Prices				
			Total this year	Inc. or Dec. compared with 1941		Totals		Increase or Decrease		Highest 1941	Lowest 1941	Jan. 16 1942	Yield % (See Notes)	
						This Year	Last Year							
South & Central America														
Antofagasta (Chili) & Bolivia	834	11.1.42	20,700	+ 4,880	2	£ 37,320	£ 30,160	+ £ 7,160	Ord. Sk.	104	3½	104	Nil	
Argentine North Eastern	753	10.1.42	ps. 151,100	+ ps. 2,200	28	ps. 5,181,800	ps. 4,400,600	+ ps. 781,200	"	4	1	3½	Nil	
Bolivar	174	Dec., 1941	4,500	+ 1,800	52	47,694	45,200	+ 2,494	6 p.c. Deb.	8	2½	10	Nil	
Brazil	...	...	...	...	...	...	...	...	Bonds	8	2½	10	Nil	
Buenos Ayres & Pacific	2,801	10.1.42	ps. 1,450,000	+ ps. 134,000	28	ps. 36,953,000	ps. 33,436,000	+ ps. 3,517,000	Ord. Sk.	7½	1½	6½	Nil	
Buenos Ayres Great Southern	5,082	3.1.42	ps. 2,736,000	+ ps. 555,000	27	ps. 60,589,000	ps. 52,998,000	+ ps. 7,591,000	Ord. Sk.	104	3½	10	Nil	
Buenos Ayres Western	1,930	3.1.42	ps. 758,000	+ ps. 95,000	27	ps. 22,283,000	ps. 18,398,000	+ ps. 3,885,000	"	9	2½	8	Nil	
Central Argentine	3,700	10.1.42	ps. 1,694,600	+ ps. 217,550	28	ps. 49,086,150	ps. 39,159,000	+ ps. 9,927,150	"	8½	2½	7½	Nil	
Do.	...	...	...	...	...	...	...	...	Dd.	21	1	3	Nil	
Cent. Uruguay of M. Video	972	3.1.42	24,774	+ 2,519	27	617,627	555,054	+ 62,573	Ord. Sk.	9½	1½	7½	Nil	
Costa Rica	188	Nov., 1941	23,078	+ 2,298	22	114,236	93,515	+ 20,721	Ord. Sk.	151	11½	12	16½	
Dorada	70	Nov., 1941	13,060	+ 1,260	48	136,030	134,200	+ 1,830	1 Mt. Db.	97	97	90½	6½	
Entre Rios	808	10.1.42	ps. 210,700	+ ps. 4,500	28	ps. 7,471,400	ps. 6,142,900	+ ps. 1,328,500	Ord. Sk.	64	1½	7	Nil	
Great Western of Brazil	1,030	10.1.42	13,200	+ 1,000	2	16,900	17,800	+ 900	Ord. Sh.	11½	1½	7	Nil	
International of Cl. Amer.	794	Nov., 1941	\$431,078	+ \$79,499	48	\$5,097,659	\$5,098,199	+ \$540	"	...	...	...	...	
Interoceanic of Mexico	224	Dec., 1941	5,675	+ 945	52	78,050	77,230	+ 820	1st Prof	1	6d.	1	Nil	
La Guaira & Caracas	1,918	3.1.42	26,940	+ 7,952	1	26,940	18,988	+ 7,952	Ord. Sk.	43	1½	5	Nil	
Leopoldina	483	7.1.42	ps. 259,300	+ ps. 400	1	ps. 259,300	ps. 259,700	+ ps. 400	"	43	1½	5	Nil	
Mexican	319	Nov., 1941	12,157	+ 975	22	66,948	57,186	+ 9,762	"	66½	1½	3½	4½	
Midland of Uruguay	386	31.12.41	5,447	+ 3,230	52	145,834	175,725	+ 29,891	Ord. Sh.	66½	1½	3½	4½	
Nitrate	274	10.1.42	\$3,586,000	+ \$1,484,000	28	\$97,627,000	\$92,736,000	+ \$4,891,000	Pr. Li. Sk.	43½	29	42½	7½	
Paraguay Central	1,059	Dec., 1941	76,699	+ 11,843	26	632,542	393,325	+ 239,217	Pr. Li. Sk.	61½	11½	8	7½	
Peruvian Corporation	100	Nov., 1941	c53,000	+ c15,000	22	c244,172	c 203,683	+ c40,489	"	...	...	...	...	
Salvador	1534	4.1.42	13,375	+ 8,525	1	13,375	21,900	+ 8,525	Ord. Sk.	52	24½	46	4½	
San Paulo	160	Dec., 1941	2,430	+ 775	26	27,760	17,140	+ 10,620	Ord. Sh.	1½	6½	1½	4½	
Taltal	1,346	10.1.42	19,847	+ 1,638	28	540,371	418,831	+ 121,540	Ord. Sk.	28	1½	3½	Nil	
United of Havana	73	Nov., 1941	1,294	+ 62	22	6,686	5,631	+ 1,055	"	...	...	...	...	
Uruguay Northern	...	...	...	...	...	...	...	...	...	...	...	...	...	
Canada														
Canadian National	23,560	7.1.42	1,035,800	+ 151,200	1	1,035,800	884,600	+ 151,200	Perp. Obs.	94½	85½	94½	4½	
Canadian Northern	...	...	...	...	...	...	...	...	4 p.c. Gr.	104½	99½	100½	4	
Grand Trunk	...	...	...	...	...	...	...	...	Ord. Sk.	13	7½	12	Nil	
Canadian Pacific	17,137	7.1.42	753,200	+ 125,200	1	753,200	628,000	+ 125,200	"	...	...	...	...	
India														
Batal Light	202	10.11.41	4,297	+ 8,138	30	107,340	98,700	+ 8,640	Ord. Sk.	345	253	340	4½	
Bengal & North Western	2,099	Nov., 1941	283,425	+ 15,228	10	528,525	513,931	+ 14,594	"	101½	95½	100½	4½	
Bengal-Nagpur	3,269	10.10.41	234,750	+ 14,924	27	4,993,938	4,533,077	+ 460,861	"	98½	92	97½	7½	
Bombay, Baroda & C. India	2,986	31.12.41	369,750	+ 36,300	39	8,119,875	7,440,150	+ 679,725	"	105½	101½	101½	4½	
Madras & Southern Mahratta	2,939	10.11.41	192,225	+ 38,510	30	4,400,295	3,653,868	+ 746,427	"	342	290	340	4½	
Rohilkund & Kumaon	546	Nov., 1941	49,125	+ 296	10	72,275	95,874	+ 1,401	"	100	87	99½	3½	
South Indian	2,421	31.10.41	159,003	+ 20,574	29	3,114,177	2,698,292	+ 415,885	"	...	...	...	...	
Various														
Beira	204	Oct., 1941	82,103	+ 1,176	4	82,103	117,730	+ 35,627	Pr. Sh.	1½	29½	2½	Nil	
Egyptian Delta	610	31.10.41	11,565	+ 1,176	29	168,612	117,730	+ 50,882	B. Deb.	68	45	60	5½	
Manila	...	...	...	...	...	...	...	...	inc. Deb.	90½	85½	99½	6½	
Midland of W. Australia	277	July, 1941	18,648	+ 7,251	4	18,648	11,397	+ 7,251	"	...	...	...	...	
Nigerian	1,900	25.10.41	41,081	+ 9,811	30	1,483,406	1,059,899	+ 423,507	"	...	...	...	...	
Rhodesia	2,442	Oct., 1941	482,053	+ 4	4	482,053	...	...	"	...	...	...	...	
South Africa	13,291	22.11.41	810,591	+ 43,574	34	25,712,444	23,098,246	+ 2,614,198	"	...	...	...	...	
Victoria	4,774	Aug., 1941	1,046,106	+ 157,817	9	2,001,145	1,757,717	+ 244,428	"	...	...	...	...	

Note. Yields are based on the approximate current prices and are within a fraction of ½. Argentine traffic is given in pesos.  
† Receipts are calculated @ 1s. 6d. to the rupee      § ex. dividend